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REGARDING TELEPHONE GROWTH; TO REGULATE OR BOSS?

The number of telephones in the United States now is estimated to be well over 18,000,000. According to the Bell organization statistics, on January 1, 1927, there were 17,746,168 stations in service, and the increase in the first five months of the year has pushed the total over the larger figure.

The 1927 edition of TELEPHONY'S "Directory of the Telephone Industry" (corrected to April 30) lists 8,415 commercial companies operating 50 or more stations, or a switchboard. Counting all but small rural lines, the Bell statistical bureau reports 9,677 large and small telephone companies, of which 490 do not connect with the Bell system. They operate 171,916 telephones. The 9,677 companies have 20,032 exchanges, of which 5,998 are Bell exchanges and 14,034 belong to Independent companies.

The Bell places the total investment in telephone plant and equipment in the United States at $3,400,000,000. Quite a sizable business you are in, Mr. Telephone Man!

* * * *

In answer to the question, "Why does the average number of telephone calls per day show such an astounding increase in the last few years?" the Illinois Bell Telephone Co. says:

"The answer, of course, is the gain in the number of telephones. During 1926 there was a net gain of 781,000 telephones owned and operated by the Bell system alone.

During the same period the total number of exchange telephone calls over the Bell system wires increased by 1,091,000,000 over the year 1925, and the number of toll and long distance calls increased by 90,500,000.

As each new telephone is added, that brings the system in contact with just so many more persons and, therefore, makes it more valuable and useful to the public."

* * * *

But while there are more telephone calls from year to year, and actually from day to day, because there are more telephones in service, this is not the only reason why the telephone is constantly growing in public use, for along with the increase in its facilities there has been a corresponding improvement in service.

This improvement during 1926 was particularly marked, as is evidenced by the fact that the Bell figures show that the number of exchange plant troubles per unit of plant was reduced 17 per cent. Independent telephone service improved in no less degree.

Another accomplishment during the year which tends to make the service more valuable and, therefore, of greater use, was the fact that the average length of time for completing toll calls for the Bell system during the year was two minutes per call, which is the lowest for any year by 35 seconds, while the quality of voice transmission was practically perfect in 88 per cent of the toll calls, this being an improvement of 7 per cent over the previous year.

As American business becomes more efficient it demands better service of all kinds. So far as telephone service is concerned, American business will not find improvement lacking. As a matter of fact, telephone service has shown business the way.

* * * *

How far can a utility commission go in the direction of telling a service company how to run its business?

This important question has been discussed before, and it comes up now from an interesting angle by reason of the Illinois Commerce Commission trying to dictate how the operators of the Illinois Bell Telephone Co. shall answer a subscriber's call.

The commission does not approve the telephone company's practice of having its operators say "Thank you" after receiving the subscriber's call instead of repeating the number, and cited the company to appear and show cause why the old method should not be followed.

* * * *

The company does not recognize the right of the commission to interfere in such matters, and contends that the "Thank you" practice expedites service, contributes towards creating a friendly feeling between patrons and company and, on the whole, has been found to be an improvement over the former method that the commission wants to reestablish.

It is not denied that a utility commission

has the power to pass on general questions involving service conditions, but in matters of details it seems more sensible to leave the decision to the company management, which, of course, has more knowledge and experience than the state regulatory body.

The sole aim of the company is to give good service and satisfy the subscribers. Sometimes it seems to be one of the aims of the many government agencies that now meddle in business affairs to peck and nag at people just to show their authority.

It would be interesting to know how much time and energy are wasted in complying with the demands of the countless commissions and bureaus that have been created to make political jobs so we all can be "regulated." It would not only be interesting but surprising.

* * * *

The higher courts have more than once ruled that there is a wide difference between utility regulation and interfering with the company management. On questions of management the judgment of the company executives is supposed to control. The commissions have been told "Hands off management."

It is to be hoped that the mania for "regulation" does not reach the point where the commissions claim the right to dictate what kind of a "flivver" the telephone lineman will drive or what make of pliers he must use.

* * * *

In these days, when the financial skirmishers are galloping over the country looking for telephone properties to buy on which to load investment issues, it behooves the owners of telephone companies to "watch their step" in discussing such matters with strangers. The point is well covered in a special bulletin sent to all member companies by President MacKinnon of the United States Independent Telephone Association, in which he says:

"My attention has been called to letters sent to our member companies by parties offering to finance telephone properties and asking for information about members who may possibly be interested in disposing of their properties or about the properties against which it is proposed to issue securities. Some of these letters are from responsible houses, others are from brokers whose only purpose is to establish such a relationship as will enable them to claim a commission in connection with some transaction.

A few of our members have become entangled in this way merely by getting into correspondence. We want to suggest that answers should not be made to inquiries without a knowledge of the standing of the party inquiring."

Good advice that should be heeded.

Trunk Plans and Plant Extensions

One Method Used in Compilation of Studies of Assembly Trunk Plans in Plant Extensions—Fundamental Data Required and Method of Utilizing it—Rules for Simplifying Work of Assignment of Trunk Groups to Various Cables

By Gordon R. McGregor,

Engineering Department, Bell Telephone Co. of Canada, Montreal, Quebec, Can.

The statement has been made that the major difference between the telephone business and any other form of commercial endeavor lies in the fact that an increase in the volume of business does not result in a proportionate increase in net profits.

As everyone knows, the advantages to be had from mass production in a manufacturing business result in an appreciable decrease in unit costs, whereas, a telephone company encounters such intricate complications that they experience a constantly-rising "cost per station" as the business expands. Careful analysis has shown that this condition of unbalance is brought about, to a surprisingly large extent, by the fact that the capital invested in trunk plant increases out of all proportion to the toll plant investment as an exchange develops.

In view of this ever-increasing influence exercised by the trunks, the necessity and value of a comprehensive plan governing trunk plant extensions is at once evident, and an attempt will be made in this article to outline one method being used in the compilation of these studies. For simplicity of description, the case of an exchange having ten operating centers and served by direct trunking will be used as an example.

The first step is to decide for what future period the plan is to be effective. Several factors exercise an influence on this decision, chief among them being the central office program. It has been found, however, that from two to three years is the longest period for which an accurate and useful trunk plan may be drawn up.

Having reached this decision, it is now necessary to obtain the requisite fundamental data, as follows:

1. An estimate of the inter-office, toll switching, long distance recording, information and traffic miscellaneous trunk requirements as of the study date. Under the heading of "Traffic Miscellaneous" are included such groups as plug-in lines, chief operator locals, call indicator make-busy, and "call circuit" trunks.

It is essential that the various types of trunks be kept entirely separate on this estimate, owing to the different treatment and limits which will be applied to each group.

2. The plant department is asked to furnish an estimate of the plant and commercial miscellaneous trunk requirements; such groups as wire chief locals, test lines to centralized testing points, official P. B. X. locals, P. B. X. tie trunks, Morse loops, radio, police and fire alarm, and holding time recorder circuits.

This department should also furnish a plan showing the entire existing trunk plant, the trunk groups and the number of pairs not available for trunks in each cable.

3. From the plant accounting department, a price table is obtained giving the first cost in place of all cables suitable for trunking purposes, and the costs installed of such special equipment as loading coils, autotransformers and special long trunk repeaters. This list should also contain a statement of the annual charge percentages to be applied to each of the different items.

The next step is to compile a table of governing data. This should include:

1. The limiting loop, stated in transmission units, and the classification of each office. By classification is meant the percentage of business to residence stations and other considerations which place an office in either the metropolitan or suburban category.

2. The standards of transmission to be maintained between each of the various classes of office.

3. The supervision limits to be adhered to.

4. The distances between all offices, measured along the trunk conduit, and including any alternative routes.

5. The effective toll terminal loss.

If the area under consideration is in the process of changing from manual to automatic, and if special apparatus has not been installed in the automatic offices, provision must be made for trunking coin-

box and P. B. X. trunks to adjacent local offices. The usual practice is to include these pairs in the plant miscellaneous estimates.

In the event of an office being scheduled for relief on or about the study date, it will be found best to provide trunk facilities for a peak load in the old office and also to have sufficient pairs connected to the new office for initial testing. In extreme cases, these groups to the new office must be large enough to handle the traffic from the full initial subscribers' load, until such time as trunks in the relieved office are thrown spare.

Having collected this information and made provision for any special demands which may be put on the trunk plant, the actual work of the study may now be proceeded with.

Prepare a series of forms, one example of which is shown in the accompanying illustration.

At the head of the first colmun, place the names of the units in the first center to be treated—this is usually the main business office. Beneath this entry, list vertically the names of each of the other offices in the area.

The ensuing text describes the nature and method of development of the consecutive columns, proceeding horizontally across the form.

In the first column, under the heading "Type," metropolitan or suburban is entered, according to the classification.

The second column lists the effective loop limit stated in TU.

On a separate schematic map showing the trunk routes between all centers, each route is assigned a symbol, such as *A, B. C.*, etc. These symbols are entered in the third column, and opposite them in the fourth column, the respective trunk distances for each alternative route.

The fifth column shows the complete load for each trunk group and includes all the miscellaneous trunks having the same characteristics as the regular inter-office circuits. In most cases, it will be found that the toll switching, information, recording, and test lines will be the only exceptions, and these trunks are dealt with on separate forms of a similar nature.

The entries in the sixth column represent the number of TU left for trunks in each group. The method of arriving at these figures is as follows:

Assume the standards of transmission to be maintained between any two subscribers on limiting loops in different offices to be as follows:

Metropolitan to metropolitan.....18 TU
Metropolitan to suburban.....20 TU
Suburban to suburban.....22 TU

As an example, consider the case of a trunk between a 9 TU suburban office and a 6 TU metropolitan office, and assume the central office equipment losses to be 2 TU. Add the subscribers loop losses—namely 9 and 6 TU—divide this sum by 2 to obtain the average transmitting and receiving loss in the subscribers' loops, add the central office losses, and subtract this total from the transmission standard. This equation may be written:

$$\text{Transmission Standard} - \left(\frac{L_1 + L_2}{2} + \text{Central Office Losses} \right) = \text{TU left for trunks.}$$

Substituting the values in this example, it becomes:

$$20 - \left(\frac{9+6}{2} + 2 \right) = \text{TU left for trunks.}$$

$$= 20 - (7.5 + 2)$$

$$= 10.5 \text{ T. U.'s left for trunks.}$$

In some cases, it is considered good practice to reduce the standard of transmission between contiguous suburban offices by 2 TU. This is only true, however, where a high community of interest exists between the two areas, and where the additional cost of better grade trunks is not excessive.

The next group of columns is headed "Transmission Make-Up," and one column is assigned to each of the gauges used in the trunk plant. For example, a group 29,100 feet in length and having 11.3 TU left for trunks, would show an entry of 10,950 feet in the No. 22 gauge column gauges which would result in a loss of 11.3 TU in a circuit 29,100 feet in length.

The next column lists the resistance of the various circuits specified in the preceding group of columns.

The remaining columns on this form are used for recording the characteristics of the groups which are decided upon in the study, and are not filled in until its completion.

One of these forms is prepared for each office, showing the trunks to and from all other centers, with the exception of such groups as have appeared on similar forms already made. It will be seen from this that the number of groups appearing on each consecutive form will decrease by one.

Having completed these calculations, the next step is to commence the actual assignment of the trunk groups to the various

..... EXCHANGE AREA

19.... TRUNK STUDY.

Date.....

Offices	Type	TU	Route	Dist.	No.	TU Left	TRANS. "MAKE-UP" #19 Gauge	#22 Gauge	#24 Gauge	Res.	PROPOSED "MAKE-UP" #19 Gauge	#22 Gauge	#24 Gauge	TU Used	Res.	Loading	L.H.
Main to & from	Met.	6															
North	Sub.	9	A	28.5	64	10.5		17.96	10.54	1128		20.5	8.0	10.31	1079	-	*
South	Sub.	9	A B	41.5 42.0	38	10.5 10.5	38.45 40.21	3.05 1.79		718 705		All		7.64	1360	M-88	*
West	Sub.	8	A	33.0	41	11.0	2.66	30.34		1026	4.30	28.7		10.84	999	-	*
East	Met.	6	A B	7.0 7.6	235	12.0			All	363			All	2.90	363	-	-

Sample of Form Used in Study of the Trunk Plant with Illustrative Data.

and 18,150 feet in the No. 24 gauge column. This represents the combination of cables. This work is done on a large schematic plan showing the size and gauge of all existing trunk plant.

The study at this point resolves itself into a matter of trial and correction on the basis of comparison of annual costs. However, there are several rules which, if adhered to, will greatly simplify the work, namely:

1. Prepare a field-of-use chart, which indicates the band of limits, both length and transmission, within which any particular type of trunk is the most economical. This will be found extremely useful in answering, without tedious calculation, such problems as the economic advisability of installing No. 22 gauge medium loaded trunks in preference to a combination of Nos. 19 and 22 gauge.

2. In assigning groups to existing cables, endeavor, as far as possible, to keep rearrangements at a minimum, but this feature should not be allowed to interfere with a design having combinations of gauges which result in standard or only slightly better transmission. It is important that no group be assigned to a cable make-up

giving transmission much better than called for.

3. If the make-up of a group is designed to meet the transmission requirements, and it is found that this combination of gauges results in a resistance in excess of the supervision limit, a special cost comparison on an annual charge basis is necessary to determine the advisability of using special apparatus or improving the gauge of cable used in order to bring the resistance down to the limit.

In this connection, it should be kept in mind that groups, at present working between manual offices, will have a considerably higher supervision limit as soon as one or both become machine switching. This is obviously a factor in favor of special apparatus rather than gauge increase.

4. If it is found impossible to place the whole of any one group in one cable, every effort should be made to keep the characteristics of each circuit identical, as complications arise in the adjustment of central office equipment if the resistances vary appreciably in the different pairs of a group.

5. Where there are two or more loaded groups in the same lead, care should be taken to have as many common loading points as possible. This practice is economical owing to the fact that the cost per coil decreases appreciably when potted in the larger capacity cases.

If these rules are adhered to in general, they will be found to minimize the amount of trial and correction which would otherwise be necessary in assigning the loads to existing cables and the design of new plant.

Upon the completion of this work, each group is checked throughout and results listed on the form previously described, the lengths of various gauges being shown in the columns headed "Proposed Transmission Make-Up." The next two columns list the TU used and the resistance on each trunk resulting from this make-up, and the last two columns indicate whether loading or special supervision apparatus has been applied.

The study is now completed and it remains only to trace the working plan and write in the number of pairs of the groups in each cable, the loading points, and the number and type of coils at each point.

A study of this nature is extremely valuable in the preparation of plant extension estimates, especially so in areas which are changing to machine switching and where the adoption of new office locations is scheduled in the near fuure.

If a study is drawn up each year for the period three years in advance, the trunk plant will gradually arrive at the condition where each group is provided with standard or slightly better transmission, each trunk cable will be working to its maximum economic efficiency, and every new installation will co-ordinate with both the future and existing trunk plant as a whole.

New York Telephone Co. to Build in Newark, N. J.

The New York Telephone Co. will build at Broad and Lombardy streets, Newark, N. J., a 20-story building as headquarters for the New Jersey Bell Telephone Co.

An application to consolidate the New Jersey properties of the New York company and the Delaware & Atlantic Telephone & Telegraph Co. is before the New Jersey Public Utilities Commission.

Four Days to Distribute 76,000 Directories in Omaha.

It took 21 telephone company crews to distribute in four days in Omaha the 76,000 copies of the Northwestern Bell's last directory issue. The number distributed is 1,000 in excess of the last distribution six months ago, but the use of standard type, closer editing and finer paper has decreased the bulk of each copy materially.

The office statistician figured out that, placed end to end, they would cover a distance of 14 miles. The total issue weighed in excess of 86,000 pounds.

Most of World's Telephones Are Commercially Owned.

Statistics show that 71 per cent of the telephones in the world are owned by commercial companies. The remaining 29 per cent are government owned, usually in countries where the government still retains control for military reasons, as it retains control of strategic railways.

THE HEART OF MAY

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

Someone asked me the question: "Why is it hard to get a position as an operator in a city telephone exchange after you are 25 years old?"

I have no doubt that this question has been turned over in many minds. For that matter, though, it is more difficult to get a position of any sort after one has reached the age of 25, especially where a number of people are employed.

Whether a woman is 16 or 26, if she would keep apace with progress, she should adapt herself quickly to changes and new methods; especially when she is in the ranks.

Does she, as a rule? Ask the average business man, the employer of a number of people. He has undoubtedly formed his conclusion, for his reply to Miss Twenty-Six is, usually, "No opening."

Miss Twenty-Six knows that he has openings now and then. "Now, what is the reason?" she mentally questions herself.

I wonder if it may not be that she has become too well satisfied with the ways and methods of yesterday and considers not how they will apply tomorrow.

"Unborn tomorrow; dead yesterday," says Fitzgerald. "The present hour alone is man's," says Johnson.

"The present hour" which divides "dead yesterday" from "unborn tomorrow," is our opportune time to work and plan for the growth of tomorrow.

Lot's wife looked back toward "dead yesterday," but she did not retard the progression of man one bit. The whole cavalcade moved on without her. And then she had no choice, except to stand and look back toward "dead yesterday" until she crumbled where she stood.

Although we know justice was meted out to her, yet we cannot help but feel sorry for her. She was probably leaving an environment which she enjoyed, regardless of how others felt. And when forced to leave against her will, she hardened her face and lived inwardly—a deadening thing to do, because she had no council but her dark thoughts. And what did those dark thoughts do for her finally?

Says Progress to all of us, whether 16 or 26 years old:

Come choose your road and away, my lad,
Come choose your road and away!
We'll out of town by the road's bright crown
As it dips to the dazzling day.
It's a long white road for the weary,
But it rolls through the heart of May.
—*Alfred Noyes.*

And because it rolls through the heart of May—Sweet Sixteen—she is chosen in preference to twenty-six.

MORAL: Keep the heart of May.

"White Mountain" State's Meeting

Telephone Association of Vermont Holds Convention at Burlington—Program One of Exceptional Merit and Participated in by Many of Members—Group Conferences Have Informal Discussions—Features of General Sessions

The seventh annual convention of the Telephone Association of Vermont, which was held at the Van Ness Hotel in Burlington, June 14 and 15, was largely attended and developed into an exceptionally fine meeting. In the opinion of seasoned convention goers, the Vermont meeting was one of the best conventions of the smaller associations that has been held this season.

There was a registered attendance of about 225, of whom approximately 50 were operators. The program consisted of general, traffic, plant and accounting conferences. Addresses were short and to the point and the entire program was in the nature of an informal round-table discussion in which everyone participated.

Pervading all of the sessions was a spirit of friendliness, good cheer and of pleasure which will undoubtedly be reflected in the exchanges of everyone who attended the convention.

All the officers were reelectd, as follows: President, C. D. Cushing, of Bethel; vice-president, C. L. Speare, of West Corinth; secretary-treasurer, C. L. Ovitt, of Enosburg Falls; auditor, F. Harding Chessmore, of Jonesville.

Informal Talks at Opening Session.

At the opening session on Tuesday morning, June 14, a series of informal talks were presented, which was followed by a business meeting.

Harry L. Ford, secretary of the Burlington Chamber of Commerce extended Burlington's hospitality in his address of welcome. Mr. Ford spoke briefly but in an effective manner on the use of the telephone and what a great need it is in the present time.

C. D. Cushing, president of the association, also welcomed the members and guests. He talked about the great advancement made by the telephone industry in the past 50 years. As a verbal illustration he stated that when Lindbergh arrived in Paris, he was talking with his mother in Detroit, Mich., a few minutes after his landing.

C. L. Speare, vice-president of the association and president of the Orange County Telephone Association of West Corinth, told the audience that ever since he was a little boy he delighted in colored pictures. Although he laid no claim to being an art critic, he said that he knew what he liked and that the hall filled with members of the association was to him a beautiful picture.

He further declared that many years ago it was almost impossible to get a handful of persons together to attend a convention and when they did, they were always at odds with one another. Times have changed greatly since and he believes that the work will progress more as time passes.

M. W. Hicks, president and general manager of the Granville Telephone Co. of Granville, N. Y., and F. W. Story of the connecting company department of New England Telephone & Telegraph Co., Boston, also addressed the convention.

J. F. Alexander of Saxtons River; A. W. Foote of Middlebury; C. M. Goodrich, of Northfield and F. Harding Chessmore, of Jonesville, auditor of the association, were others who spoke briefly.

Business Meeting.

At 11:45 a business meeting was held and the report of C. L. Ovitt, secretary-treasurer was given. There was also an election of directors, appointment of committees and a meeting of the board of directors.

Following the business meeting a buffet luncheon was served at 12:30.

The first part of Tuesday afternoon was given over to special conferences on traffic, plant and construction, and accounting problems.

Miss Katherine A. Crowley of Granville, N. Y., conducted the traffic conference, and 20-minute talks were given by Miss Ethel Derby of Enosburg Falls, Mrs. Clara White of Bethel, Miss M. L. Ryan of Boston, Mass., and Mrs. Claribel H. Foote of Pawlet. Miss A. J. Connolly of Boston, Mass., gave a class in voice technique at the end of the conference that was most interesting and practical.

M. W. Hicks, of Granville, N. Y., conducted the plant conference, assisted by Robert Burns, H. M. Martin and J. F. Alexander.

The accounting conference was lead by F. E. Waring, of Boston, Mass.

Out-of-State Speakers.

The speakers in the afternoon included F. B. MacKinnon, Chicago, President, United States Independent Telephone Association; J. G. Ihmsen., Albany, N. Y., president of the Up-State Telephone association of New York; D. C. Cox, Syracuse, N. Y., New York Telephone Co.; and G. K. Manson, chief engineer of the New England Telephone & Telegraph Co.

Mr. MacKinnon spoke on the need of uniform and standardized methods among the Independent companies in auditing, taking care of depreciation, and providing for future expansion which amounts to a 100 per cent increase every 15 years.

He also spoke of the relations of the Independent companies with the Bell companies, and with the public utilities commissions. Mr. MacKinnon cited the steps taken by the A class companies in standardization and in effecting agreeable relations with other organizations.

Particular stress was laid on the importance of each individual employe in the successful functioning of the telephone service as a whole.

Two conferences were in order on Wednesday morning. From 9:30 until 11 o'clock a plant conference conducted by G. F. Hagerman, connecting company engineer, in which the "Plant Gang" of the association gave short talks and discussed many plant questions and practices.

At the same time a traffic conference was held. This was conducted by Miss Katherine A. Crowley, traffic supervisor, of the Granville Telephone Co. of Granville, N. Y. An address on Reporting Troubles and "The Importance of Maintaining a Record of Them," was given by Miss N. C. O'Brien, chief operator of the Heath Telephone Co. of Shelburne Falls, Mass.

An address on Health Training by Miss Theresa Boden, who is employment supervisor of the New England company at Springfield, Mass., was an unusually interesting feature of the session.

An explantion of the toll table used by the New England Telephone & Telegraph Co. and the one used by the A. T. & T. Co. given by H. E. Roby, superintendent of traffic, at Montpelier, concluded the traffic program.

The General Conference.

A general conference was conducted by C. L. Speare, vice-president of the Telephone Association of Vermont, following the traffic and plant conferences.

The speakers were:

"Advertising and Publicity," T. J. Feeney, publicity manager, New England Telephone & Telegraph Co., Boston, Mass.

"Voice Technique," by Miss A. J. Connolly, Boston, Mass.

"Plant and General Accounting for Small Telephone Companies," by F. E. Waring, traveling accountant, connecting company department, Boston, Mass.

Discussion: "Management and Operation of a Small Telephone Company," by C. M. Goodrich, manager, Northfield Telephone Co.; J. F. Alexander, Jr., manager, Saxtons River Telephone Co., and William Brizzee, manager, Topsham Telephone Co.

Governor John E. Weeks addressed the convention on Wednesday afternoon, taking as his subject the relation of the telephone to the public and to the government.

Following him the speakers of the afternoon were Clarence R. White, commissioner of industries of Vermont; and O. R. S. Mosses, of Manchester, N. H.

Dean C. Howland of Springfield, Mass., spoke on "Necessity of Proper Protection" and gave a demonstration of "Power Follow Through." This was one of the most interesting parts of the convention. This demonstration was followed by demonstration of telephone and wiring equipment.

On Tuesday evening the delegates and visitors participated in a three-hour excursion on Lake Champlain.

On Wednesday evening a banquet was served at the Hotel Vermont, at which those attending the convention were the guests of the New England Telephone & Telegraph Co.

Following the banquet, the Vitaphone, or "talking movies" was shown and demonstrated by Sergius P. Grace, of the Bell Telephone Laboratories.

The first reel appropriately reproduced to the eyes and ears of the audience, Thomas A. Watson, the associate of Alexander Graham Bell in the invention and perfection of the telephone, who explained the steps in the invention of the telephone and its developments during the first 50 years of its use.

Other sounds, such as his tapping the wooden box of the first telephone, his setting a thin diaphragm into vibration—the first sound heard over an electric wire—came to the audience as clearly as did the words he spoke.

Following this exposition of telephone history, reels and records were demonstrated by the vitaphone, of singing, whistling and various musical instruments, all perfectly synchronized in sound and action.

Mr. Grace in his talk prior to the vitaphone exhibition, told his audience that the present method of making "talking movies" would likely become obsolete in the near future. It has been less than a year since its first public demonstration.

The method now used is to take separately a film and a record of the performers, putting them together later with synchronizing machinery. In the laboratories now, research workers are working on a device for filming sound as well as vision.

Before explaining the vitaphone, Mr. Grace exhibited and explained several other products of inventors in the Bell laboratories, more directly connected with the telephone industry, the invention of new substances for wire, induction coils, and vacuum tubes. He completed his talk with an explanation of television, the latest marvel.

Television, the vitaphone, the artificial larynx, and the orthophonic talking machine, said Mr. Grace, are merely by-products of the laboratory experts whose primary purpose is to perfect every branch of telephone equipment.

Utilities' Use of Cresoted Pine Poles

Increase in Use of Cresoted Pine Poles by Utility Companies in Past Few Years—The Preservative Treatment and Service Characteristics of Pine Poles—Address at Missouri Association of Public Utilities at Cape Girardeau

By E. E. Boehne,

International Creosoting & Construction Co.

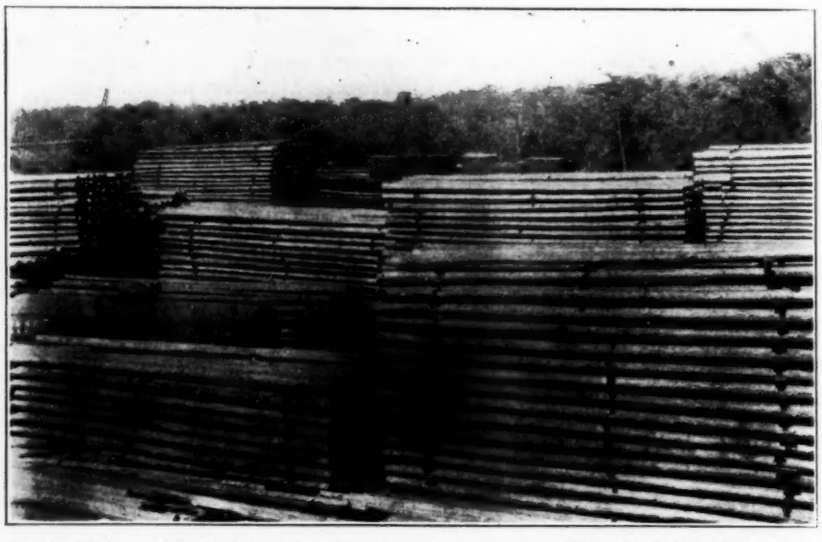
Undoubtedly some of the companies represented in this audience are using creosoted pine poles in their lines now, who were not using them two or three years ago. That condition is almost national in its scope.

The use of creosoted pine poles, according to government statistics, increased 500 per cent between 1920 and 1925; 500,000 were installed in 1923. That number increased to a million in 1924. What makes this latter fact particularly outstanding is that it was the only species of pole that materially increased during that period. Obviously there is represented here a very definite swing of the industry.

When utilities, which had not considered creosoted pine poles before, began to study them intensively, the creosoting industry found it necessary to put its information on the subject in readily available form, and to improve the means of disseminating it. This paper is a part of that effort.

Why should you be interested in the comparative value of poles? What makes a difference in their worth to the utility company?

In a word, a pole's worth is measured by the length of time it gives satisfactory life in the line. What shortens that life in the great majority of cases, is decay. Decay then, and its prevention—which is preservative treatment—are prime points for consideration; and these points are reviewed briefly in the following, along with a more detailed discussion of the creosoted pine pole's characteristics in service.



Typical View of Pole Seasoning Yard Showing Correct Method of Stacking Poles. The Uniform Spacing, Wide Alley-Ways Between Stacks, and Creosoted Separating Strips Between Each Layer of Poles Provide Thorough Even Air-Seasoning.

Decay in wood is caused by low forms of plants called fungi, and by bacteria. Through the secretion of little understood chemicals, they dissolve the wood fiber, and its substances serve as food for the fungus. The science of timber preservation consists in poisoning that food—the wood. Creosote is the poison. The question of injecting it deeply into the wood by pressure is the work of the modern wood preserving plant.

There are other wood preservatives, but creosote is by far the best known. The highest grade that can be used, and the only grade that should be used, is that which complies with the specifications of the American Wood Preservers' Association and the American Railway Engineering Association.

The first step in the creosoting of pine poles, or rather a step preliminary to their treatment, is to "season" them; that is, to remove a sufficient amount of the moisture,

which all freshly-cut wood contains, to permit the entrance of the creosote. This is accomplished either by allowing the wood to dry in a seasoning yard, or by steaming it in the treating cylinders.

Two processes have recognized standing

The Pole Framing Yard at Creosoting Plant. Creosoted Pine Poles Are Framed Prior to Treatment, Framing Being in Accordance with the Customer's Specifications. Hence They Arive on the Job Ready for Installation. Creosoted Pine Poles Should Never Be Framed After Treatment.

and are in general use for pole treatment: They are the Bethel process, using 12 pounds of creosote per cubic foot of wood, and leaving the wood cells full of creosote after treatment; and the Rueping process, retaining eight pounds of creosote per cubic foot, and leaving the wood cells partially empty after treatment.

In the Bethel process, after the material is placed in the cylinder, a vacuum of about 24 inches is maintained until the wood is as dry and free from air as practicable and then, without first breaking the vacuum, the cylinder is completely filled with the creosote oil.

After the retort is filled, additional creosote is forced into the cylinder by means of pressure pumps, the pressure being gradually raised to and maintained at not less than 125 pounds per square inch at a temperature of 180 to 200 degrees F., until the required amount of the preservative has been forced into the wood. The pressure is then released, the oil drained from the cylinder, and another vacuum drawn. The object of this final vacuum is to remove the surplus creosote from the surface of the timber, thus making the wood dryer on the surface and cleaner to handle.

In the Rueping process, as the first step, air is pumped into the cylinder and thus into the wood under high pressure; then while this air pressure is maintained, the cylinder is filled with creosote. As the oil enters, the air is gradually released, but without allowing the pressure to drop. In this way the cylinder is filled with oil, and a considerable quantity of air is entrapped in the wood at the same time. More oil is then pumped in and the pressure is increased.

After the maximum quantity of creosote has been injected, the pressure is released, the oil drained from the cylinder, and a final vacuum applied. This reduction in pressure allows the air entrapped in the wood to expand and force out much of the oil originally injected, leaving partially empty wood cells. The initial injection on eight-pound Rueping treatment averages 16 to 20 pounds of creosote per cubic foot of wood.

Pine, of all the commercial species, is the most susceptible to preservative treatment. In a given cylinder charge, creosote applied as just described, penetrates many poles throughout. Deep penetration is an all-important factor, for it is practically a direct measure of the value of treatment —this because any kind of wood will check and, once the checks extend in beyond the creosoted layer, untreated wood is exposed to decay and insect attack. Deep creosote penetration, therefore, is a first essential to good pole treatment.

So much for the cause of decay and its prevention by chemical preservation.

If the question were asked, "What is the outstanding feature in the service of creosoted pine poles?" this would be the answer: "They have the longest life of any kind of wooden pole and, during that life, their strength remains practically undiminished."

The strength of pine is outstanding in that it is the highest, the most permanent, and the most uniform of any of the pole woods. Exhaustive government tests show its modulus of rupture to be over 30 per cent greater than the nearest other pole species.

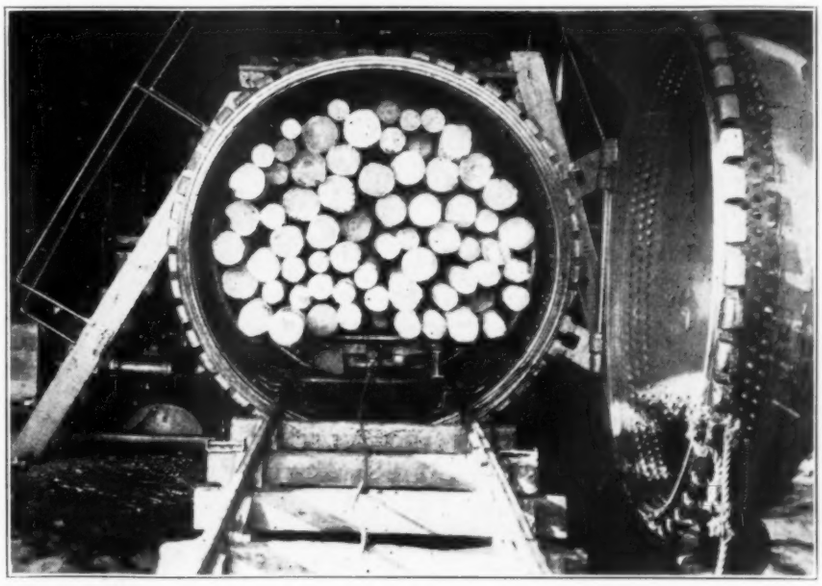
What is almost as important is that in 15 or 20 years after installation, the strength is no less than when the poles first went into the line. Recently the American Telephone & Telegraph Co. tested sound creosoted pine poles 27 years old and found them practically as strong as new.

As to uniformity, the Bureau of Standards, after studying the plotted results of the load-in-pounds, at which hundreds of test poles broke, pointed out that the strength of individual poles in the Southern yellow pine group departed less from the average than any of the other species. That is, pine's strength is the most uniform.

In line construction, practical advantage is taken of these facts in one of two ways —either by using smaller poles or by using longer spans.

Life.

The life of creosoted pine poles is not known. The oldest installations are still



Ready to Seal the Cylinder Door and Begin Preservative Treatment. This Cylinder Has Standard Gauge Track. It Is 165 Feet Long and 9½ Feet in Diameter.

in use; their present condition is good and there is nothing to indicate how much longer they will last. Several lines, cited below, for which records are available, show less than 10 per cent renewals in 25 to 30 years. In many lines 10 to 20 years old it has not been necessary to replace a pole.

The remarkable thing is that these very old poles are still in apparently splendid condition. An increment boring taken at the ground line on a 25-year-old pole is of such appearance that, if placed in a group of borings from creosoted poles just from the treating cylinder, it could not be distinguished.

Various published estimates of the life to expect are: Pennsylvania Electric Association—35 years. Graybar Electric Co., full-cell treatment—40 years.

Southwestern Bell Line Crossing Nueces Bay, Corpus Christi, Texas.

From "Notes on Wood Preservation and Utilization in Europe," by George M. Hunt, Forest Products Laboratory: "The life of full-cell treated pine poles in England was understood to be from 30 to 40 years . . . There are said to be 40,000 creosoted power line poles in Southern France which are over 20 years old and have not yet reached their average life."

A few lines of long service life are:

Oklahoma Railway Co., 200 poles installed, 1908. No replacements to date.

Southwestern Bell Telephone Co., Dallas to Sherman, Texas, installed, 1909, 50 miles in length. No replacements.

American Telephone & Telegraph Co., Washington, D. C., to Norfolk, Va., installed, 1897, 90 per cent of poles unaffected by decay, according to most recent A. T. & T. inspection report.

Lake Charles Railway Light & Water Works, Lake Charles, La. Poles for city service installed, 1899, 1 per cent replacements to date.

Beaumont-Port Arthur, Texas, interurban line; 692 poles; line installed, 1912. To date, three poles replaced (mechanical causes; not decay).

Termites or White Ants.

The attack of white ants on poles is becoming an increasingly vexing problem. Once they gain entrance to a pole, nothing can stop them. An investigator for Stone & Webster has just published his discovery of white ant attacks in disturbing numbers in the New England states.

The Western Union Telegraph Co., conducting studies on its own lines, only a year ago, learned, to its surprise, that white ant attack on poles was occurring in the states of New York, Pennsylvania and Illinois. Here is a paragraph from a paper by the Western Union construction engineer, who has been studying this problem:

"It appears that attack by termites is so serious in Southern California that, in order to secure a satisfactory life, it may be necessary to employ only poles that have been treated the full length. But termite attack is not limited to Southern California. We are finding that a great many of the poles which we replace, in various parts of the country, have been more or less riddled by borers at and below the ground line.

Evidently, this condition is becoming widespread throughout the country, and poles are deteriorating much faster than by decay alone." Quoting further—"I have stressed this matter of insect attack because I believe it a subject of great importance."

The white ant problem is serious. Any pole-using utility may well study it. The status of creosoted pine poles, with regard to white ant attack, is covered by the statement quoted below from government bulletin No. 1231, "Tests of Methods of Protecting Woods Against Termites or White Ants." The bulletin says:

"The most effective preservative in protecting timber to be set in the ground from attacks by termites is coal-tar creosote. . . . Impregnation by the full-cell process with coal-tar creosote renders wood resistant for at least 25 years."

To touch briefly on two or three further points: There is the matter of conductivity—whether creosote affects the resistance of wood to the passage of current. This problem belongs to the electrical engineering field, rather than to the field of wood preservation, and the conclusions of engineering committees that have studied it are quoted as follows:

Summary of Southwestern Bell report, 1924:

"The question is sometimes raised as to whether untreated poles are more suitable than treated poles for joint use with electric companies. This bulletin indicates that pole resistances are lowest when the pole surfaces are wet and that under these conditions the resistances of treated and untreated poles are approximately the same. For these reasons, it is felt that, as far as safe operating conditions and safety to linemen are concerned, treated poles are as satisfactory for jointly-used lines as untreated poles."

Summary from American Wood Preservers' Association Conductivity Committee, 1923:

"Poles—Your committee has decided that for all practical purposes, the conductivity question, as related to poles, holds no interest for these reasons:

1. The distribution engineer is concerned with insulator and crossarm resistance, the pole resistance forming but a small fraction of the circuit to the ground.

2. Creosote is the preservative in general use for pole preservation, and the experimental data show that it increases resistivity of timber.

3. Steel poles and crossarms are in common use on transmission lines."

In times past, and occasionally even now, the question is raised as to use of creosoted pine poles on busy city streets. Some objection has been raised on the basis that their oily surface will damage the clothing of people who might come in contact with them.

With the advent of the Rueping empty-cell process, this objection has been largely eliminated. The science of wood preservation, like other sciences, has advanced greatly during recent years and with the better knowledge of timber seasoning methods, of creosote, and of treatment, the creosoted pine pole, particularly when treated by the Rueping process, has but little objection on this score. Comparatively speaking, it is a clean pole.

Hundreds of cities are using them on busy streets.

The foregoing has touched but briefly on the more important characteristics of the creosoted pine pole, with relation to its service in the line. In so brief a paper many minor points, though worthy of consideration, must be omitted.

But one vital point with regard to buying: Creosoted pine poles do differ in quality. They all look black on the surface, yet the service in your line depends on what is beneath the surface—the soundness of the timber, the quantity and quality of the creosote, and the thoroughness of the treatment. Price considered alone—the blind worship of the low bid—is suicidal to pole service.

One of the outstanding developments in modern pole business has been the substitution of a quality or a service motive for the price motive in buying. The trend of the cooperative supplier today is distinctly away from first cost and toward the more substantial values that frequently are inconsistent with low price.

Rapid Growth of Florida Company

Started in 1912, the Independent Company at Winter Park, Florida, Now Serves Nearly 1,000 Local Subscribers and Provides Service to Several Nearby Towns—Rapid Development Since New Switchboard Was Installed in 1925

By A. D. Boal,
Advertising Manager, Kellogg Switchboard & Supply Co.

"There may be on this continent a village more beautiful than Winter Park, but if so I have never seen it. Old Deerfield is lovely but it is dead. Winter Park is alive. Its beauty is that of youth; its spirit looks forward, not backward. It is like a stirring New England community in the time of my boyhood in a setting of everlasting vendure and many flowers and abundant sunlight."—Irving Bacheller.

Carl H. Galloway, President and General Manager, and Lena K. Galloway, Treasurer, of the Winter Park Telephone Co., Winter Park, Fla.

Winter Park, one of Florida's most prosperous and attractive resort towns, was founded more than 40 years ago by a group of distinguished New England people, and the spirit and traditions of its founders still exist in the architecture of its buildings and in the names of lovely tree-lined streets and avenues. Set in spacious lawns, and banked deep with tropical shrubbery, are hundreds of charming homes. Broad avenues, arched overhead with majestic water oaks, from which hang myriad festoons of Spanish moss, sparkling little lakes (of which there are 18 within the city limits), lovely municipal parks and playgrounds, add to the beauty and charm of the place.

Winter Park is on the main line of the Atlantic Coast Line Railroad, 142 miles south of Jacksonville and 40 miles from the East coast. It is also on two of the paved trunk line highways of the state. There are 645 miles of paved highways in the county with 340 miles under construction.

Winter Park is fortunate in having unusual educational facilities, one of them being Rollins College with Hamilton Holt, widely-known editor, lecturer and publicist at its head.

There is a beautiful high school in Spanish architecture, which would be a credit to any of our large metropolitan centers. There is also a grammar school and a careful plan has been worked out for additional educational facilities as the city grows.

Winter Park has a splendid public library, fine churches and strong fraternal organizations.

Much attention has also been given by the city council to recreation. There are public playgrounds, baseball diamonds and golf courses.

Winter Park is also to be envied for its fine hotels and its modern shops and excellent cafes and tea rooms.

With all these advantages, an average temperature of 70 degrees during the winter with cool nights in the summer, makes living conditions most ideal.

Besides the home aspect of Winter Park, it is a city of industrial opportunities. Some of the finest orange and grape-fruit groves in the state are located nearby with adequate packing house facilities in the city. Conditions are good for truck-gardening, poultry-raising and dairying, the growing season continuing practically all through the year.

Two-Story Brick Building of Winter Park Telephone Co. Located in Business Center of Winter Park, Fla.

Merchandising and manufacturing enterprises are growing steadily and the commercial future of Winter Park is assured.

The Winter Park Telephone Co. began with the efforts of its president, C. H. Galloway, who commenced stringing a few telephone wires in a community where there was no local telephone service available, nor could any operating telephone company be induced at that time to extend its lines into the sparsely settled Winter Park territory.

This was in the year of 1912—and

now the company serves nearly 1,000 local subscribers, besides giving service to Maitland, Altamonte Springs, Eatonville, Forest City, Lake Howell, Goldenrod, Gabriella, Fairview and Lockhart, all located in the solid center section of the state of Florida.

This phenomenal growth has been due not only to the increased population of the territory, but to the sound progressive policies of Mr. Galloway and his associates. The growth was fairly conservative until August 1, 1925, when the present Kellogg service switchboard was cut into service. With the cut-over, a slightly advanced rate was authorized, which was cheerfully accepted by 100 per cent of the subscribers who became highly enthusiastic over the new service.

Not only was the new service well received, but during the first 12 months after its cut-over there was an increase of 500 subscribers as compared with 100, the greatest increase of any previous year. The company's estimate for the original installation was made for equipment to take care of five-year growth, it being a three-position section, each position fully equipped. The growth has far exceeded the estimate, the company having just completed the installation of three additional positions, two of which are fully equipped as shown in one of the illustrations.

The switchboard is equipped with full Kellogg features, consisting of:

Non-interference.

Secret service; after the connection is established, operators cannot listen to subscribers.

Keyless listening; the operator is not required to throw a listening key, but is automatically connected with the subscriber on plugging-in.

Answered calls are automatically registered, showing number of calls each operator handles.

Audible multiple busy test on calling cord.

Operators' automatic cut-off, when calling plug is inserted.

Individual four-party harmonic automatic ringing on calling cord; bell rings at intervals until called party answers.

Revertive ringing tone to the calling subscribers; this enables the calling party to hear the ringing and know that the operator has completed the call.

Ringing controlled by calling subscribers; if called party fails to answer, ringing stops automatically when calling party hangs up.

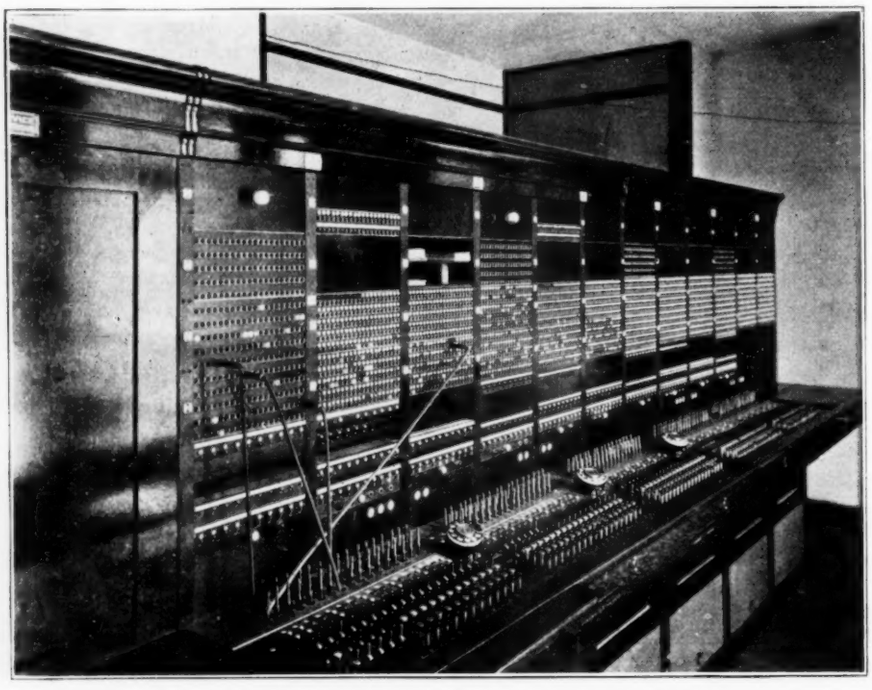
Dark keyshelf.

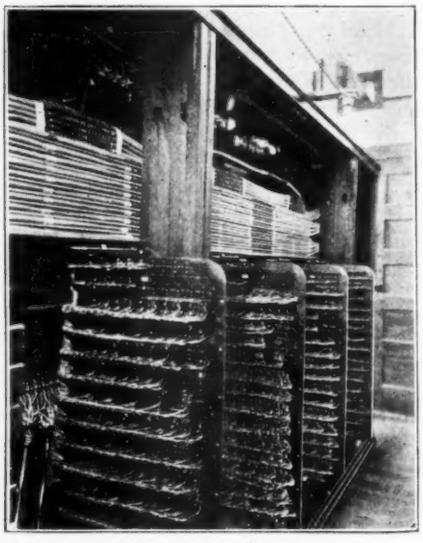
Positive supervision; lighted lamps on keyshelf, always have definite meaning to operators.

Instantaneous double disconnect on line lamp recall. This feature insures the same fast answer on a recall as that obtained on an originating call. It also immediately removes the busy test when a call is completed, so that the line is available for incoming business, whether the operator has removed the cords or not. The switchboard is also equipped with multiple line lamp distribution making every call available to any operator.

The Winter Park Telephone Co. is

Commercial Office of the Winter Park Telephone Co., Winter Park, Fla.—A View of Operators' Restroom in Winter Park Exchange.





Kellogg Six-Position Service Switchboard Installed in Exchange at Winter Park, Fla.—Rear View of Board.

soundly financed. It owns its real estate and buildings. When securities are issued to cover expansion, the company's offerings are eagerly purchased by its own subscribers and others personally acquainted with the company and its management. In fact, at no time has the company found it necessary to go outside to market its securities. The accounting system is that prescribed by the Interstate Commerce Commission, and a substantial reserve is set aside for depreciation.

The organization and personnel of the Winter Park Telephone Co. consists of C. H. Galloway, president; Lena K. Galloway, treasurer; Winifred W. Lewis, secretary; J. Irb Strong, plant superintendent; and Elizabeth Sachse, chief operator.

Lightning Jumps from School Flagpole to Telephone Cable.

Telephone service at Aurelius, Mich., which is served by the Aurelius Bevay Telephone Co., was temporarily demoralilzed recently when a bolt of lightning burned through the main entrance cable just back of where it enters the board.

The nature of the trouble was peculiar. The bolt struck a tall metal flagpole in front of the village school, lighting it from top to bottom, and then leaped to the telephone lines about 20 feet distant. When it burned the cable, all the lines on the switchboard, with the exception of one to Eaton Rapids, which did not pass through the main cable, went out of service.

Investigation showed the fuses blown, but when they were replaced, the lines still refused to function. An "S. O. S." was sent to the office of the plant chief of the Michigan Bell Telephone Co. at Lansing, and a switchboard man was dispatched to aid the connecting company. An hour after his arrival, temporary repairs were made and service restored.

Sale of Anglo-Portuguese Company

Anglo-Portuguese Telephone Co. Purchased by English Interests Headed by Sir Alexander Roger—Orde s to Be Placed in English Factories—Comments by the London Newspapers Relative to Sale of This and Other Companies

Reference has been made several times in TELEPHONY's news columns to the fact that Great Britain has noted with dissatisfaction American telephone expansion in other countries. English industry objects to American interests buying control in European or South American telephone companies, especially if that control means a loss of manufacturing business by England, which has need of all possible employment for its own population.

In the May 24 issue of the London Daily Mail it is stated that the Anglo-Portuguese Telephone Co. has been purchased by the International Automatic Telephone Co., Ltd., interests. Press comment indicates that the Anglo-Portuguese company, of which Sir Alexander Roger, one of the British telephone leaders, is chairman, will place all its orders for new equipment in English factories.

The Anglo-Portuguese Telephone Co. operates 20,000 lines and the big program of expansion contemplates increasing this three-fold.

The Daily Mail article follows:

"The announcement that Viscount St. Davids has retired from the board of the Anglo-Portuguese Telephone Co., that Sir Alexander Roger has taken his place as chairman, and that the Hon. Sir Arthur Stanley has also joined the board, indicates that the first step has now been taken in the important developments in the telephone industry recently forshadowed in The Daily Mail.

Sir Alexander Roger is chairman of the Automatic Telephone Mfg. Co., and is also a director of British Insulated Cables. The Hon. Sir Arthur Stanley is also on the board of the Automatic Telephone Mfg. Co.

British Insulated Cables formed the Automatic Telephone Co. in 1911, primarily to develop the Strowger automatic telephone system which has since been adopted by the London G. P. O. as well as by various overseas telephone services.

The Automatic Telephone Co., which is now understood to have secured control of the Anglo-Portuguese Telephone Co., is stated to have recently acquired control of the British Columbia Telephone Co.

The strength of this combination is accentuated by the fact that a controlling interest in the Automatic Telephone Mfg. Co. is held by the International Automatic Telephone Co., which has the world rights of the Strowger system."

In the Financial Times (London) of May 24 appeared some interesting comments which throw a light on the British feeling regarding the competition to acquire telephone systems in foreign countries. These comments show that England is keenly interested in world-wide telephone expansion and means to protect its home industry.

After recording the election of Sir Alexander Roger to the chairmanship of the Anglo-Portuguese Telephone Co., the Financial Times says:

"In this deal it is understood that Sir Alexander Roger brought together trust companies and individuals specializing in telephones to purchase the undertaking from the existing interests—mainly companies in which Viscount St. Davids is interested. While the price paid for shares is not known, it is believed to be substantially over par. Debenture stock has also been secured.

This deal is an answer in part to the well-known attempt by important American interests to obtain control of international telephone communications. A representative of the Financial Times, who interviewed an authority very closely in touch with international telephone matters, was informed that in recent months there had been a marked advance in telephone shares, due, first, to a greater appreciation of the telephone business, and, secondly, to the development which has taken place in America—the Home of the Telephone.

Specializing is the keynote of the American business. The Bell company, for instance, said the authority, has 3,000 engineers who have no operative duties. They are engaged solely on research work throughout the whole organization. All the subsidiary companies pay a small tribute to the parent concern, and the proceeds are devoted to obtaining the best engineering, technical, legal and financial advice.

Most of the foreign telephone concerns owned by British companies are financed from Britain, and it would be impossible for every one to obtain the benefits such as the American subsidiaries of the Bell company, but a great deal can be done by combination. This is evidently the reason for the latest deal. It will also keep control out of the hands of important American interests who are endeavoring to secure a hold on all telephone companies, and will be of great advantage to Britain. With control in British hands, all orders for new plant will come to this country.

The Anglo-Portuguese Telephone Co. has 20,000 lines, and in ten years it is expected that the number will be doubled, and may be trebled. That increase would represent an expenditure of £1,500,000 to £2,000 000. The ultimate capacity of the undertaking will probably be 200,000 lines. The acquiring group has all the necessary expert and financial resources to enable the company to function to its utmost.

The Anglo-Portuguese Telephone Co. was formed in 1887. The issued capital consists of 400,000 shares of £1 each, and there is £300,000 7 per cent first mortgage debenture stock.

Sir Alexander Roger is chairman of the Automatic Telephone Mfg. Co., International Automatic Telephone Co., president of the Constantinople Telephone Co., and director of seven other companies."

Converted to Strowger Automatic

Exchange of Citizens Telephone Co., Brazil, Ind., Cut Over to Automatic Operation—Description of New Building Which Houses New Telephone Equipment—Cut-Over Witnessed by Prominent Business Men of Brazil

By C. I. Kuppinger,
Publicity Department, Automatic Electric Inc.

For many years the Citizens Telephone Co., and more especially its manager, John G. H. Klingler, has had a dream of giving the city of Brazil, Ind., the finest and most modern telephone service that it is possible to obtain anywhere. With that end in view, telephone systems and buildings in every part of the country have been investigated and visited for the last several years, inquiries being directed not only to the telephone companies, but also to the telephone users as well.

Telephone books were obtained from cities in Indiana, Ohio, Illinois, Wisconsin, Pennsylvania and Iowa, where automatic operation was in use, and names were selected at random from these books. Letters were then written to every person whose name had been selected, asking his or her opinion of the automatic service as compared with the former system. More than 200 persons replied to the questionnaire, and out of this number only four preferred the old system.

As a result of the favorable replies received from the letters sent and the information gathered during the investigation by Citizens Telephone Co., Brazil telephone users are now enjoying Strowger automatic telephone service. The new equipment was cut into service at exactly 12 o'clock midnight, on Saturday, May 28, 1927.

Present at the occasion or prior to it were many of Brazil's most prominent business and professional men, including John G. H. Klingler, manager of Citizens Telephone Co., and the member of the board of directors, consisting of John F. Brown, William E. Carpenter, C. A. Cora, Theodore W. Engelhart, Harry D. Falls, C. H. Rottger and David H. Whitham.

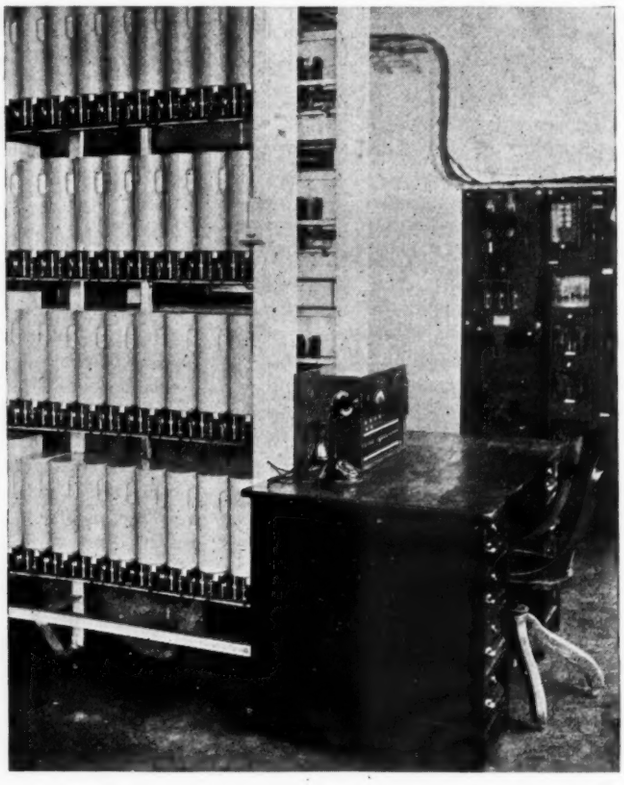
Representing Automatic Electric Inc., which company manufactured and installed the automatic equipment, were O. V. Dodge, R. H. Burfeind, W. H. Perkins, F. T. Madsen and E. Zambrano. Carl J. Pracht of Automatic Electric Inc., had charge of the operating work incident to the installation and cut-over, while the installation work proper was in charge of R. D. O'Conner. There were practically no troubles encountered at the time of the conversion.

The new building, which was constructed to house the automatic equipment is one of well-balanced line and unusual beauty for a business structure. The exterior brick is of a rough texture and a chocolate color, and is the product of local manufacturers. The trimmings are of Minnesota granite and Kentucky limestone. The general architectural trend of the design is toward Corinthian.

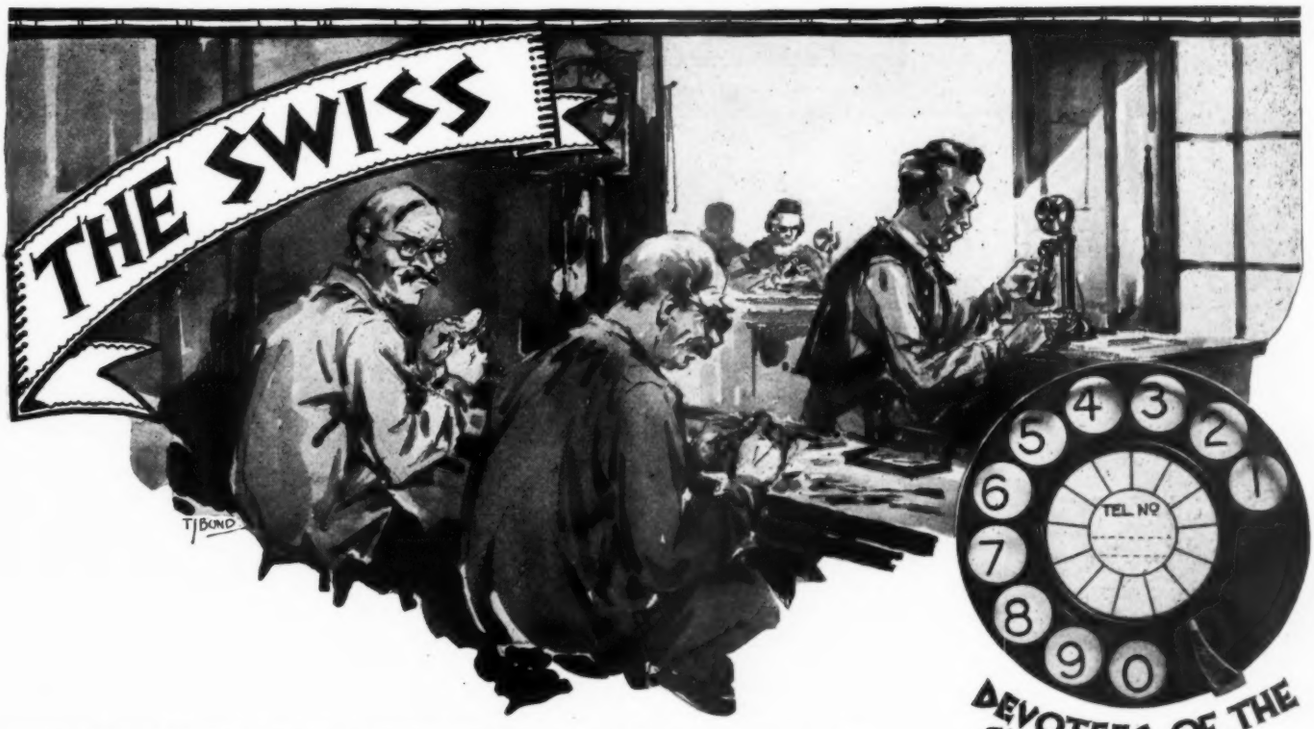
There are two entrances on the front, the eastern one leading to the stairway, with connections into the lobby, while the western entrance leads directly to the lobby of the front offices. Both doors are of paneled steel construction and fireproof

The floor of the main lobby is of tarriza consisting of marble chips set in concrete and planed to a level surface. The doors and woodwork are of solid walnut with natural finish. The walls are of rough finish plaster, painted with a grey oil paint base and faintly mottled with blue and red, presenting a very attractive appearance. Two pay stations are located in the lobby for local and long distance service to the

(*Continued on page 29.*)



The New Telephone Building of the Citizens Telephone Co. at Brazil, Ind.—Part of the Strowger Automatic Equipment with Wire Chief's Desk and Testing Turret in Foreground.



DEVOTEES OF THE STROWGER DIAL

PATRIOTISM for the fatherland and loyalty to community and family lie at the root of Swiss character and education. Religion has a strong hold upon the people; education is highly developed.

Both as a nation and as individuals, the Swiss are always ready to help those who are in trouble, and a good example of their international forethought exists in the Red Cross Society. The Swiss take a great pride in their humanitarianism; and cling to their neutrality by the whole will of the people. Their honesty is proverbial.

In Switzerland there is generally sufficient work of one sort or another for everybody; loafers are not tolerated. Conditions have been much improved by the widespread provision of electric light and power, whilst the remotest village is now reached by telephone. In their appreciation of the virtues of efficiency in communications the Swiss naturally turn to "Strowger" as the established Automatic system, based on twenty years' practical commercial operation.

Upwards of 3,500,000 Strowger Automatic Telephones installed or under construction throughout the world

"ATM" Strowger

AUTOMATIC TELEPHONE MANUFACTURING COMPANY, LTD.
STROWGER WORKS MILTON ROAD, EDGE LANE, LIVERPOOL

Associated Company
INTERNATIONAL AUTOMATIC TELEPHONE CO., LTD., LONDON

When writing to Automatic Telephone Mfg. Co., Ltd., please mention TELEPHONY.

ECONOMICA

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The latter is an outstan tu
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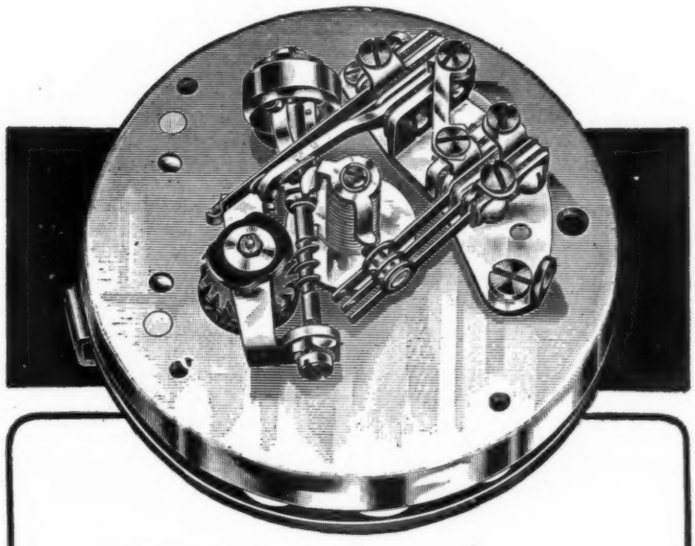
More Than 3,500,000 Strowger Automatic Telephones in Service or on Order Throughout the World

Automatic E

Factory and General Offices: 10 Bu
Chicago, U.

When writing to Automatic Electric Inc., please mention TELEPHONY



Endurance Requirements of a Government Telephone Administration Exceeded by 900 Per Cent.

DIAL endurance specifications established by an important government telephone administration now call for 500,000 operations from "0", without failure, as the minimum standard of performance for stock dials. In view of these specifications, endurance tests recently made for the Type 24 Dial are of unusual interest.

In making these tests a special dial testing machine was constructed and arranged to test six dials at a time. While in operation each dial was turned mechanically from "0" to the finger stop and then released, delivering the equivalent of ten impulses.

New stock dials were used and were tested exactly as received without special adjustment and with no additional lubrication at any time. The circuit of the testing machine was so arranged that, if any dial failed to return to its normal position, the machine would automatically stop. As each dial failed it was removed. The following table shows the results of the tests:

Dial No. 1...5,061,500 operations
Dial No. 2...6,423,425 operations
Dial No. 3...7,092,875 operations

The Test And Verification Switch Train

of the Strowger Automatic Telephone System

By EDWIN O. WALKER

Associate Director of Technical Publications, Automatic Electric Inc.

The Strowger type switch, although primarily designed to connect one subscriber's line with another, by the manipulation of a dial, is also adaptable for establishing a connection—free from all bridges or attachments—between a test desk and a subscriber's line, in the same manner. It will, therefore, be obvious that it is possible to test any subscriber's line in either a single or multi-office exchange area from the test desk. In a multi-office exchange, testing can be handled on a centralized or non-centralized basis, or on a combined centralized and individual test desk basis.

The means provided for accomplishing this form of testing consists of a separate train of switches termed the "test switch train", which is equally suitable for either centralized or non-centralized testing. Testing by the use of such a train of switches is almost universally employed in both single and multi-office Strowger Automatic telephone exchanges. It eliminates the necessity of using the cumbersome protector shoe, when testing, except for emergency purposes, and is unsurpassed for reliability, speed, and economy.

The test switch train is made up of two or three types of switches depending on whether the exchange is a single or multi-office system. In a single office system the switches used are a test distributor and a test connector. In a multi-office system a test distributor selector is required in addition to the aforementioned two types of switches. The test distributor selector is a switch similar in appearance to an ordinary selector, and like the selector it has a dial controlled vertical motion and an automatic rotary motion. The test distributor and the test connector are both similar in appearance to an ordinary connector, and like the connector they have dial controlled vertical and rotary motions.

The test distributor selectors are located in the same office as the centralized test desk. The number required depends upon the number of test desk positions installed. Several test distributors are provided for each office of the exchange network—the number in each case depending upon the office size. Usually from five to seven test distributors will amply care for the requirements of a ten thousand line office. One test connector is provided for each one hundred line unit. The test distributor selectors are connected to the centralized test desk by means of four conductor trunks. The test distributors are connected to the banks of the test distributor selectors by means of four wire inter-office trunks and the test connectors are connected to the banks of the test distributors in the same office by means of six conductor trunks.

The purpose of the test distributor selector is to select an idle test distributor in any one of the offices of the exchange network; that of the test distributor, to select a test connector in any one of the hundred line groups in the office; and that of the test connector, to select the line to be tested in the particular one hundred line group.

Aside from the use of the test switch train for testing purposes, it can also be utilized by certain operators for verification and toll offering services. In these cases, a separate group of test distributors or test distributor selectors, having access to the same test connectors used by the tester, are usually furnished for the operators' exclusive use. These test distributors or selectors are generally termed "verification switches." By means of this "test and verification switch train" it is possible for an operator at a position on which verification trunks terminate, to dial a busy telephone number and listen in on the line to verify whether it is busy, or to inform one of the talking parties that a toll call is being held, awaiting the termination of the conversation. The toll call, however, is completed over the regular channel provided for the purpose and not over the test and verification switch train.

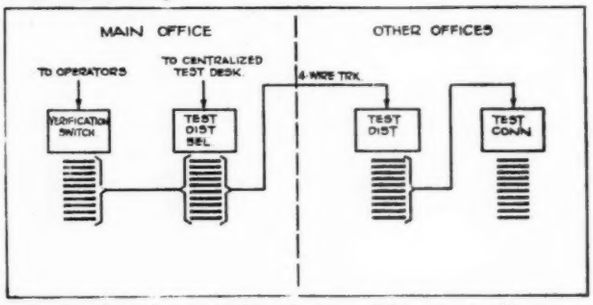
The accompanying figure illustrates a typical trunking diagram of a multi-office test and verification switch train and shows the multiple between the banks of the verification switches and the banks of the test distributor selectors which enable the same group of inter-office test distributor trunks to be employed for either testing or verification purposes.

The test switch train, in addition to its other uses, can also be used for establishing connections to operate remote control switches in unattended offices for the purpose of starting or stopping a motor generator or rectifier used to charge the storage battery, etc. It is also possible to read the voltage of the battery in the unattended office, over the test switch train trunk; and to determine what type of alarm has sounded in the office when the common alarm signal operates in the attended office.

When centralized testing is employed, auxiliary testing equipment is usually installed in each of the other offices for the convenience of the maintenance force in locating trouble within the office and for emergency testing purposes. In such cases the test trunks from the auxiliary testing equipment terminate on test distributors, and only the last four digits of the telephone number to be tested are dialed, since the auxiliary testing equipment can only be used for testing within the office in which it is located.

A better understanding of the test and verification switch train can be gained by a tabulation of some of its functions. These are as follows:

1. A busy test connector, encountered while dialing, is indicated to a tester by both an audible and a visual busy signal, and to a verification operator by an audible busy signal only.



2. In the aforementioned case either party, if necessary, may "camp" on the test trunk until the test connector becomes free. (When this condition takes place both the audible and visual busy signals cease functioning.)

3. A busy line is also indicated to a tester by both the audible and visual busy signals, but is indicated to the verification operator, only by possible conversation on the line.

4. Both the tester and the verification operator can cut-in on a line, even when it is busy.

5. Either "in" or "out" line tests can be made from the test desk. In the former case a key in the testing circuit is operated to plunge the line switch.

6. The test connector in an established connection may be released at will, when testing, while the rest of the connection remains intact. This switch can also be stepped around, one step at a time, by means of the dial. These two functions allow line routine tests to be rapidly performed and also permit a speedy check for any other purpose.

The test and verification switch train described, outlines the general trunking arrangement used in multi-office five digit systems. It should be understood that other trunking schemes, utilizing the same types of switches mentioned herein, are feasible for both single office and multi-office systems and in the latter case, that centralized testing districts may be allotted as desired. What has been said, should give the reader a general idea of a representative test and verification switch train trunking arrangement and its various functions.

This is No. 24 of a series of articles prepared by members of the Engineering Staff of Automatic Electric Inc., covering technical features of the Strowger Automatic Telephone System.

When writing to Automatic Electric Inc., please mention TELEPHONY.

(*Concluded from page* 24.)

public. A partition of walnut and plate glass separates the lobby from the cashier's offices with convenient pay windows for customers.

In order to reach other parts of the building the visitor must enter the hall which extends along the east side of the building. Under the front stairway is a stairway leading downward to the basement, to the office storeroom. The bookkeepers occupy a room about the center of the building through which entrance is gained to the cashier's office in front of it.

In the cashier's office is a built-in fireproof vault for books and records, while in the bookkeeper's office is a built-in safe.

The third room back is one of ample dimensions and is occupied by the manager, John G. H. Klingler. The woodwork here is of solid walnut. A built-in safe and lavatory facilities are provided. The room to the rear of the building is well lighted with large windows and will be used as a repair shop. The hall to the east at this point has a double wall through which the cables are brought in, extending to the equipment room upstairs.

From the rear room a wide stairway leads to the basement. The landing of this stairway is flush with the ground at the rear, where a 35-foot space is paved with concrete for the parking of cars and company trunks. This space may also be used for enlargement of the building in the future should that become necessary.

The basement construction is of solid reinforced concrete, waterproofed so that even in wet weather records and supplies kept here will be dry. It is fitted up for shop and storage work, and is well lighted with windows at the rear. An especially constructed room is also located here for the housing of the storage batteries. The usual acid-proof construction is followed, with provisions for proper ventilation. A fuel room is provided, and in the center of the basement is a complete steam-heating system, oil burning and thermostatically controlled.

The front rooms of the second floor are fitted up for business offices. The entire remainder of this floor, however, is taken up by the automatic equipment, toll board, and a lounge room for the toll operators. The latter is fitted very completely with a kitchenette and every facility for the convenience of the operators.

The automatic room is to the rear of the building, and is very excellently lighted by a tier of windows in the rear. The equipment consists of 1,000 lines of Strowger automatic equipment of the latest design, serving 2,360 stations in Brazil proper together with trunks for local service to Center Point, Clay City and Harmony, which exchanges are also owned and operated by Citizens Telephone Co. of Brazil.

The New Power Board Recently Installed by the Citizens Telephone Co. at Brazil, Ind.

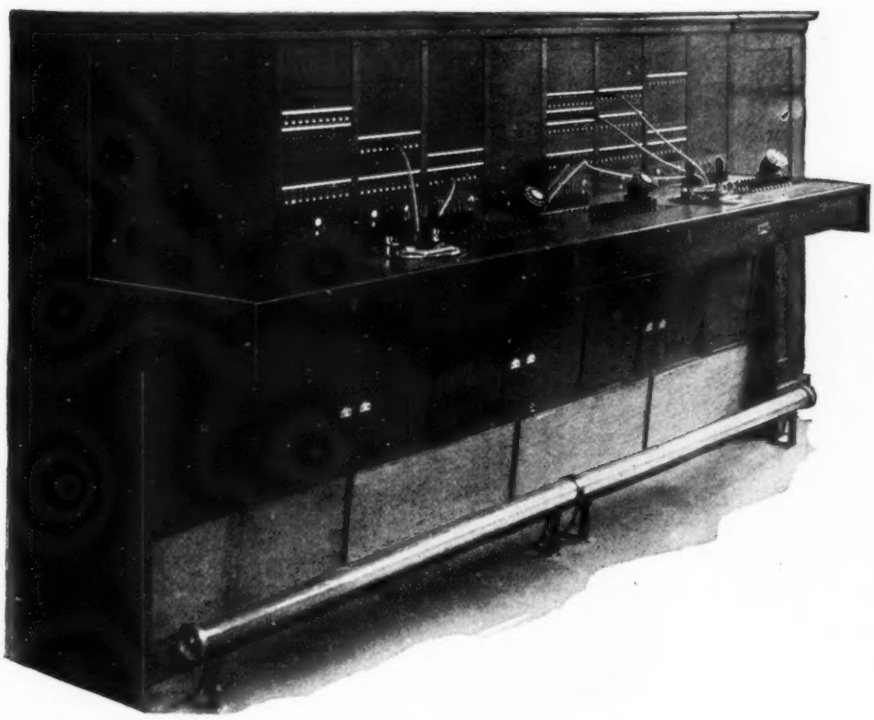
The system to be used will be three, four and five-digit. Five-frequency harmonic ringing will be used, making it possible to have as many as 10 parties on a line to serve rural lines. Toll train equipment is provided so that the toll operators can gain immediate access to any party regardless of whether that party's telephone is in use or not.

The toll board is four-position, three being equipped at present, and was manufactured and installed by Automatic Electric Inc. A turret type test desk and a chief operator's desk are also provided.

The power equipment consists of a storage battery of ample capacity, which is charged by a 50-ampere rectifier operating on the city power supply of 220 volts, 60 cycles, single phase. The charging is automatically regulated, so that the battery is maintained in a fully charged condition at all times.

Five-frequency harmonic ringing equipment is provided in duplicate, furnishing ringing current at 20 cycles, 30 cycles, 42 cycles, 54 cycles and 66 cycles.

The first call on the new automatic system was made when Manager John G. H. Klingler dialed the number of Mayor James Carpenter's telephone, and informed him that he was making the first call over the new system. Mayor Carpenter complimented Mr. Klingler on the completion of the improvement and wished the telephone company the best of success in its new building and with its new equipment.



Toll Board Furnished Citizens Telephone Co., Brazil, Ind., by Automatic Electric Inc.

Prices in the Metal Markets.

New York, June 20.—Copper—Steady; electrolytic, spot and futures, 12.50c. Tin—Quiet; spot and nearby, $67.76; August, $64.62½. Iron—Steady and unchanged. Lead—Steady; spot, 6.40c.

Automatic Telephone Fundamentals

This Is Last of Series of Articles Explaining in Simple Terms the Mechanical and Electrical Basis of the Strowger Automatic Telephone System, Which Have Appeared Weekly Since January—Part 24, Metropolitan Networks

While direct dialing from calling subscriber to called station is the quickest and generally the cheapest and most satisfactory method of automatic switching, there

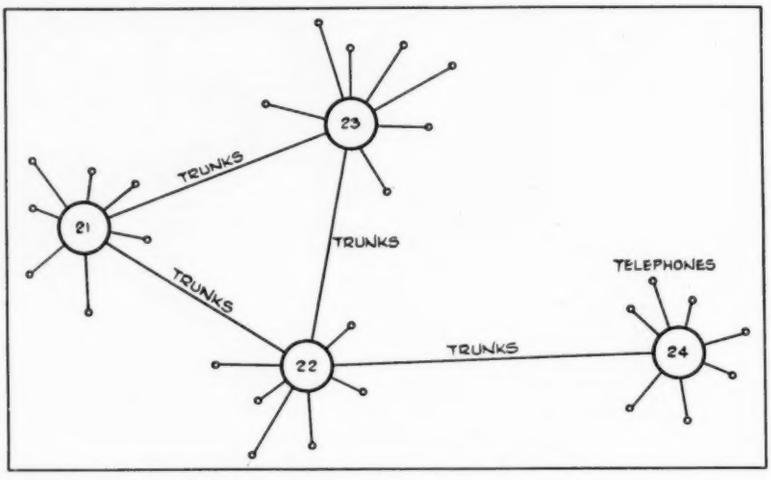


Fig. 116. Multi-Office Network Adapted for Director Application.

are local conditions under which it is very difficult and expensive to secure and arrange the necessary inter-office trunks.

The director is a device which has been devised to take charge of inter-office trunking in a case of this kind, and direct the call along whatever route is available. This at once divides the call number into two parts—the "office code" and the "numerical part." There are usually two or three office digits and four digits or five in the numerical part.

The director receives the office code and sends out digits to operate the necessary switches to extend the connection to the desired office. Fig. 116 will illustrate the differences of treatment. Let each circle represent an office whose number is written within it. This is the number which appears in the directory.

Usually there would be direct trunks between all offices; but for some reason, office 24 is best served by only one group of trunks to Office 22. When a subscriber in Office 22 calls one in Office 24, it requires only two digits to select a trunk to Office 24. But when a subscriber in Office 21 or Office 23 calls one in Office 24, it requires three digits, there being an extra selector in the train.

The subscribers dial the same office code "24," but the director in Office 21 might send out the digits "225" or "224," whatever is necessary to lead the call to Office 22, then out to Office 24. The director used by the subscriber of Office 22 might send the digits "24" exactly as received. Thus all subscribers use the same office code, but each director sends whatever digits are necessary to route it to destination. The numerical part is repeated without change.

The director is introduced into the trunking system between the line switches and the first selectors, now termed office selectors, Fig. 117.

A group of selectors associated with each trunk enable the trunk to be cut in two, so that there may be a path from substation to director, and a separate path from director to office selector.

When a subscriber takes his receiver from the hook, the primary (and secondary) line switches extend the call to the director selector attached to the trunk seized. The latter (made of a rotary switch) hunts and seizes an idle director. The dial tone then passes to the subscriber, so that he knows that he may dial. The call number is received by a number of registers, Fig. 118. The impulse distributer or register controller directs the digits one after another to the proper register.

The office register is in this case a major switch. The vertical motion records the first digit, the rotary motion the second digit of the office code. This is a two-digit office code system. Each numerical register is a minor switch and takes one of the digits of the line number.

The office code fixes the digits to be sent. This is set by means of a cross-connecting block attached to the bank of the office register. The office register has a capacity of 100 offices. It has four wipers so that as many as four digits may be sent out to reach the desired office.

When the last office digit has been registered, the office digits are sent by the impulse-sending switch, whose wipers pass over its bank once for each digit sent. Then it runs off the numerical digits, because usually the subscriber has completed his dialing and is waiting on the director. But if the subscriber delays, the director will wait for him, and send the numerical digits as fast as received.

If the call is not received or completed within a reasonable time, the call will be directed to a special service operator.

In any case, as soon as the director com-

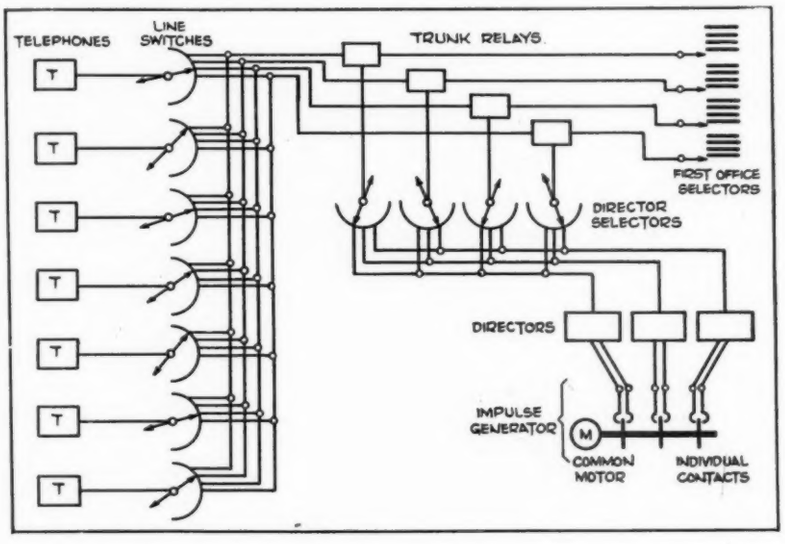
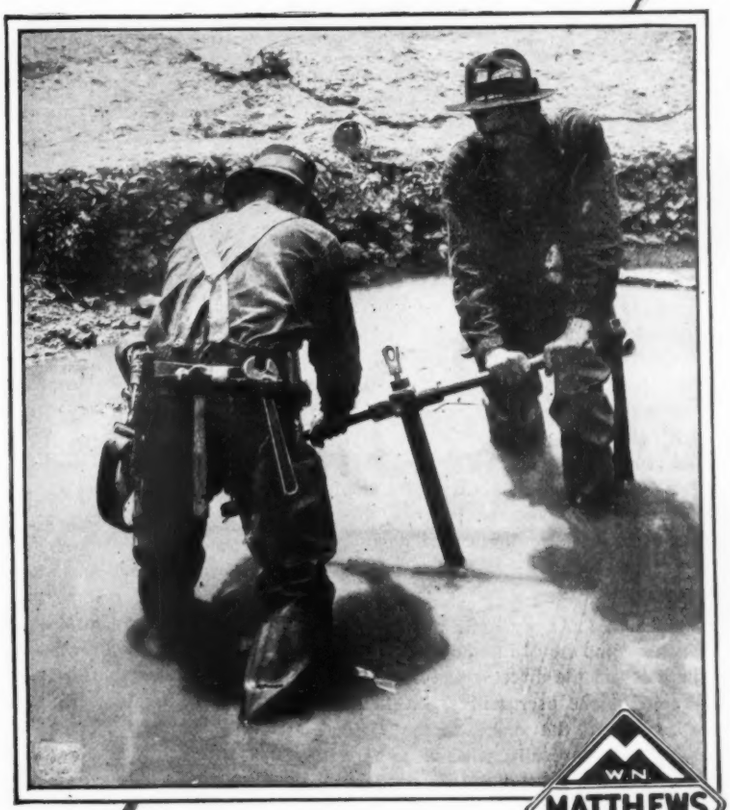


Fig. 117. The Place of the Director in the Automatic Office.

Read These Tests

Users Know from practical experience that Matthews Scrulix Anchors give continuous, dependable service under most severe conditions. Learn why.

In all parts of the world—in wet sand, dry sand, muck, hard pan, disintegrated rock, and under water, these anchors have solved difficult anchorage problems. The following examples are typical—



←Look for "SCRULIX" on the Helix

ALLENHURST, N. J.

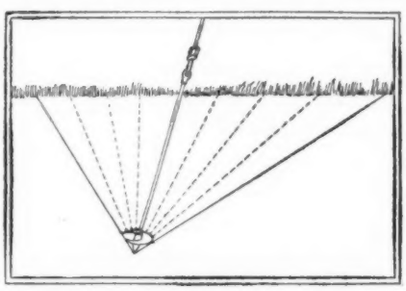
One No. 858-R Matthews Scrulix Anchor was installed with No. 567 Wrench by two men in seven minutes. The ground was sand and gravel. The pull was made by winch on a 5-ton truck from ⅜ inch guy wire attached to the anchor. Guy wire broke at 8700 lbs. Anchor did not budge. Installed two ⅜ inch guy wires and truck backed up. Blocked the truck more securely and pulled beyond the 10,000 lb. capacity of the dynamometer. The indicating hand moved about 2½ inches beyond the 10,000 lb. mark and it was estimated that the strain was about 12,000 lbs. The anchor did not move in the least. Area of anchor 50.26 square inches.

RIVERSIDE, CAL.

Installed No. 758-R, 7 inch Matthews Scrulix Anchor in pure white round silt sand. Two men installed anchor with No. 567 Wrench four feet in six minutes. Pull was made with 5-ton truck winch. Anchor started to move at 5200 lbs. and came out at 5400. Area of anchor 38.48 square inches.

CHATTANOOGA, TENN.

Test on top of famous Missionary Ridge in heavy disintegrated rock. Two men with Matthews Earth Auger and No. 567 Matthews Wrench made complete installation of No. 612-R, 6 inch anchor in 14 minutes. Ten minutes for auger hole 1 man, 4 minutes for screwing anchor down 5 feet 6 inches. Total of 18 minutes on one man basis. In attempting to pull up anchor a tree 16 inches in diameter was nearly pulled over. Engineers were all astonished at results and ability to install in this ground.



The helix of Matthews Scrulix Anchors is so designed that under strain, the lines of force radiate from the anchor helix at 45° angles so that hundreds of cubic feet of earth hold the anchor in place. This principle in Matthews Scrulix Anchors gives a tremendous holding power even in comparatively soft earth.

Write for Bulletin 801

Read the interesting details and gain more thorough knowledge of Matthews Scrulix Anchors. See just what they may mean to you. We will gladly send you this bulletin upon request.

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97

pletes its work, the trunk relays close the trunk, and the director is released to be used by others.

A three-digit office code is handled by converting the director selectors of Figs. 117 and 118 into a major (two-motion) switch and utilizing the vertical motion to record the first digit, Fig. 119. There is one of these per trunk. Each level on its bank is wired to as many directors as are necessary to handle the traffic to all offices whose office code begins with the number of the level. The directors are released for use by others, but the director selector, being attached to the trunk, is held.

In a very large system, some economy may be obtained by interposing a non-numerical director selector between the trunk relays and the major switch which records the first digit, Fig. 120. It then is called the "A" register. The rest of the digits are received by groups of directors, by levels.

Large call numbers are not easy to keep in mind from the time of looking up in the directory until completely dialed. As an aid to the memory, the first two or three digits are expressed as letters of an office name. Thus, it may be that a dial is arranged thus:

1 2 3 4 5 6 7 8 9 0
ABC DEF GHI JKL MNO PRS TUV WXY

Then the complete call number "2364821" may be listed in the directory as "CENtral 4821," so that the user will dial the first three letters of the office name. Office names must be carefully selected so as to avoid dialing the same digits; as, for example, "UPTon" and "TRUman" both become "878." A few changes in existing office names usually clear away all interferences.

The Transition Period.

Small and moderate sized telephone exchanges are usually cut over from manual to automatic "instantaneously." Large city systems require the installation of one or two offices at a time, because of the cost and of the time required to manufacture the apparatus. The transition period may stretch out over several years, during which time good service must be maintained.

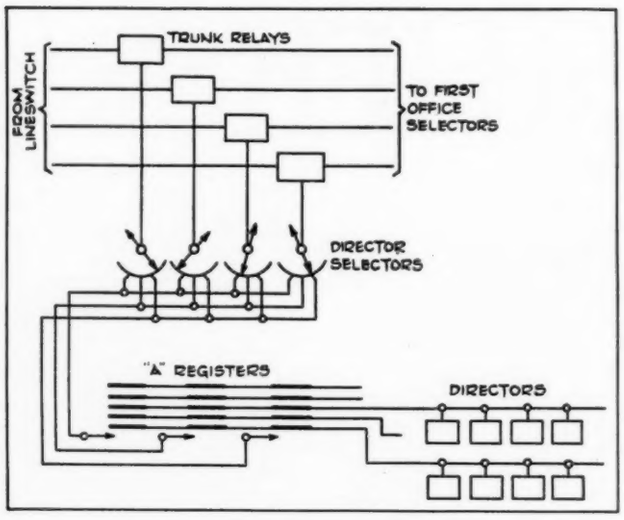


Fig. 120. Directors with "A" Registers.

When even one automatic office is cut into service, provision must be made to handle calls from manual to automatic and from automatic to manual. The manual offices trunk among themselves as before, and the automatic subscribers call each other automatically without reference to the other offices.

Several plans are available for each direction of trunking and each has its advantages. During the progress of conversion the plans are sometimes changed, as another plan becomes more feasible.

Manual to Automatic.

1. The manual A operator selects a trunk to the desired automatic office and with a dial-type calling device dials the last four digits of the call number.

2. The A operator trunks manually to a group of special operators, who complete the connection with dials.

3. The same as No. 2, but the special operators have push-button calling devices.

4. A manual multiple is provided in the automatic office, on which appear all the automatic lines. The A operators trunk manually to these B operators, who plug up the connections. It is manual all the way.

Automatic to Manual

1. All traffic is trunked to the nearest manual office, where A operators receive and handle the calls as if they originated from their own subscribers. This requires that in the directory all automatic numbers must be clearly designated. A special number must be given in the directory, which the automatic subscriber must dial to get any manual number. The automatic subscriber then speaks the manual number to the A operator who answers.

2. If the number of manual offices is small, less than ten, we can run trunks from the automatic office to each manual office in front of B operators. The automatic user would dial a digit which trunked him to the desired office, after which he would speak the number to the B operator who would plug up the connection into her multiple. The directory listing would contain this special digit (perhaps a letter) associated with each manual number.

3. The trunks from the automatic to manual offices run to a B board in each office, as above No. 2, but the automatic subscriber dials the entire manual number. The office part of the number trunks the call to the desired office. The last four digits are displayed by a "call indicator" before an idle B operator, who needs only to read the number and plug it up in her multiple.

4. Each manual office is equipped with

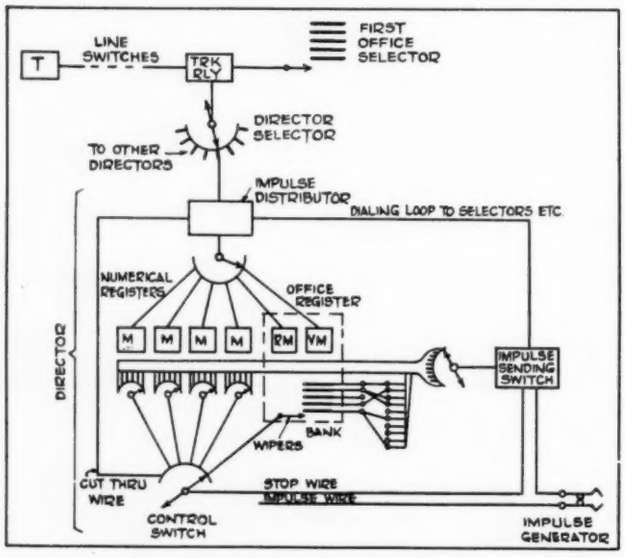


Fig. 118. Director, General Plan.

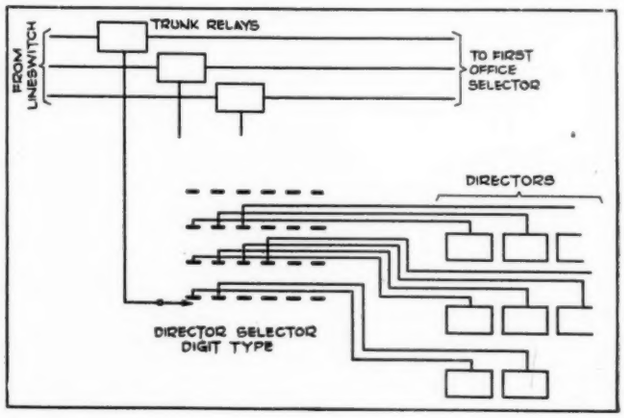
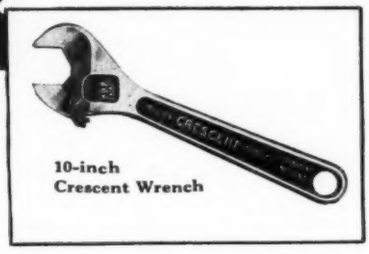
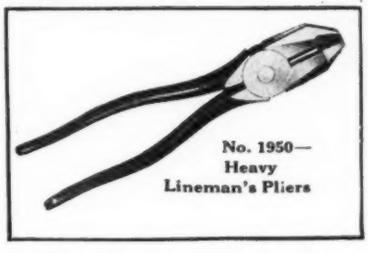
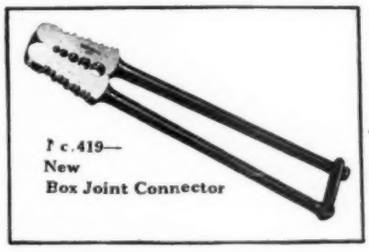


Fig. 119. Use of Digit Type Director Selectors.

In *Every* Tool Belt







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The ten-inch Crescent Wrench has a capacity opening of 1⅛ inches, can be quickly adjusted and is sure to hold. The pliers are the eight-inch "Heavy Lineman's" with tempered side cutter good for years of hard service. The new Box Joint Connector with reversible combination will handle any wire or sleeve used by telephone, telegraph or power linemen.

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enough thousands selectors, hundreds selectors, and connectors to handle the incoming traffic. The banks of the connectors are multipled to the manual subscriber lines, with suitable busy protection.

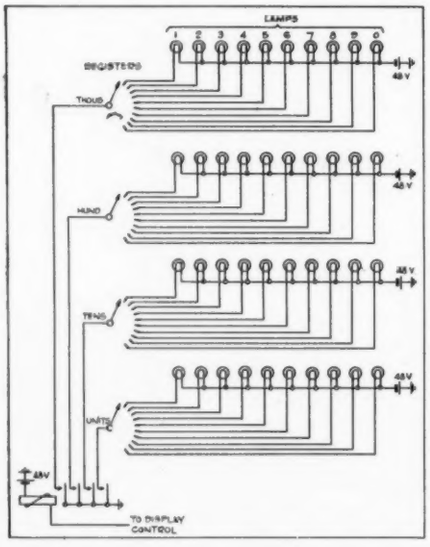

Fig. 121. Call Indicator, Display Panel and Registers.

The automatic subscriber dials the entire manual number, and it is set up automatically all the way.

Plan 3 involves the call indicator, which possesses features which merit at least a brief consideration. The two most interesting parts are the display panel and the register set.

In front of each operator is a display panel which may contain 40 lamps, four groups of ten lamps each, each group representing a digit of the line number. These lamps are under a frosted glass plate with a number over each lamp. The call number is displayed by lighting one lamp in each group.

The register set consists of four minor switches, one for each digit, and a digit control switch, also a minor switch.

The scheme may be seen in Fig. 121. At the left are the four registers, each having ten lamps, numbered "1" to "0." Imagine that by some means the four digits—thousands, hundreds, tens and units—are set up on these registers. If the number is 4278, the thousands switch will be moved to "4," the hundreds switch to "2," etc. Then suppose that a ground is placed on the "display control" wire. The relay will operate and ground the four wipers of the registers, lighting the four lamps numbered 4, 2, 7 and 8 respectively. This the operator reads.

Consider now the relation of these to the incoming plug-ended trunk, Fig. 122. Each trunk has a register selector (a rotary switch). On the banks of these register selectors are multipled the register sets. When an automatic subscriber has seized a trunk, its register selectors seize an idle register set. The thousands digit dialed by the subscriber sets the thousands register, after which the digit distributer moves to the magnet of the hundreds register. The next digit dialed by the subscriber acts on the magnet of the hundreds register.

When all have been set, the register set is ready to light the lamps of the display panel. This is controlled by the display control switch, a rotary switch which permits only one register set at a time to act on the lamps.

When its turn comes, the display control switch grounds the display control wire, causing a relay to ground each of the four wipers of the four registers. This lights the appropriate lamp in each part of the display panel as shown in Fig. 121. At the same time a lamp is lighted at the trunk plug, so that the operator knows which trunk, Fig. 122, is to be connected.

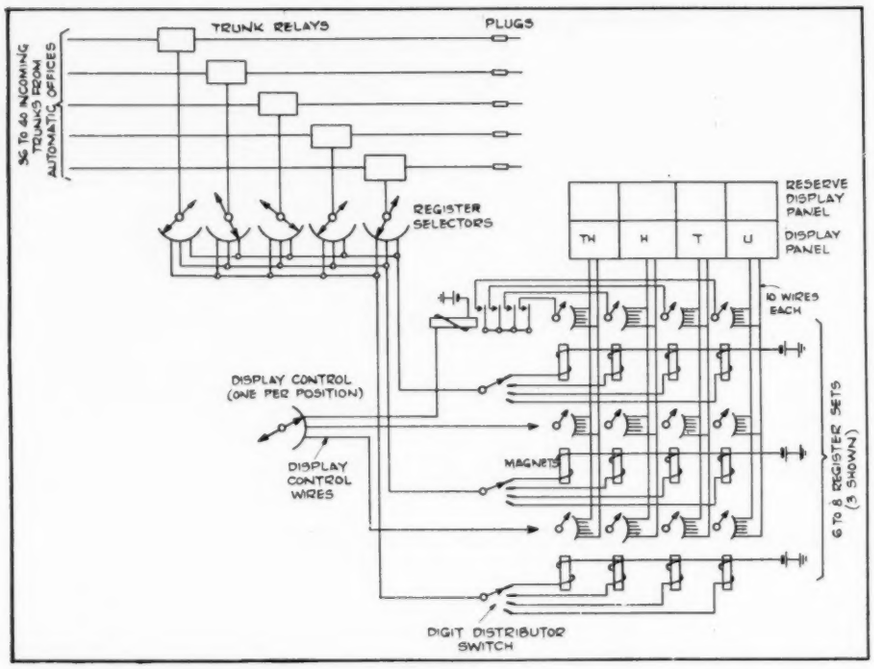

Fig. 122. The Place of the Call Indicator in a Manual Office.

She reads the number, makes the busy test, and plugs up if idle. If the called line is busy, she either plugs into a busy-back jack, or preferably pushes a busy button, and drops the plug back into its socket. The button connects the busy tone to the trunk and releases the accessory apparatus. In any case the accessory apparatus is all restored to normal, ready for use by other calls.

Several calls may be stored on register sets at the same time. But the display control switch will feed them one at a time to the operator, who with singleness of purpose watches the display panel and the lamps associated with the cords.

A reserve display panel is provided so that traffic need not be delayed if lamps burn out in the panel which is in use.

(Conclusion.)

Change of North Dakota Association District Meeting Dates.

District meetings of the North Dakota Telephone Association will be held at Bismarck on July 7 instead of July 13, as previously announced, and at Minot on July 13. The dates for the other two meeting, at Park River on June 23, and Enderlin on June 28, remain the same.

New York District Meeting at Binghamton Next Week.

A district telephone meeting and traffic conference of the Up-State Telephone Association of New York will be held Tuesday, June 28, at the Bennett Hotel Binghamton, N. Y.

Binghamton can be easily reached by all telephone people from the counties of Delaware, Chenango, Cortland, Tompkins, Tioga and Broome.

"Every telephone man within the district both member and non-member, is invited," says J. G. Ihmsen, president of the association.

First of Nebraska's Informal Round-Table District Conferences.

Secretary George M. Kloidy of the Nebraska Telephone Association held two informal conferences during the week of June 13 at the towns of Oakdale and Laurel, in the northeastern part of the state, both of them well attended. Some of the men drove as far as 150 miles to be present.

Mr. Kloidy presided at the meetings, which were round-table talks, with question, answer and discussion, the latter usually led by I. J. Devoe, chief accountant for the state railway commission.

The desire of the association to serve in a practical way was emphasized by Mr.

Quality FIRST a permanent policy

Manufactured under uncompromising standards, Natco Underground Clay Conduit easily meets the uncompromising standards of users. Witness its use in the operations of the Bell Telephone System; The Tri-State Telephone and Telegraph Company, St. Paul; The Postal Telegraph-Cable Company; The Western Union Telegraph Company; the City of New York; the City of Baltimore; the City of Milwaukee; the Pennsylvania Railroad; and a host of other companies the country over.

Quality First is a permanent Natco policy, that permanently protects users, as the conduit itself permanently protects cables. If you haven't received descriptive literature—write for it.

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General Offices: **Fulton Building, Pittsburgh, Pa.**

Branch Offices: New York, Flatiron Bldg; Chicago, Builders Building; Philadelphia, Land Title Bldg; Boston, Textile Bldg.

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The Only Concern in the World Making a Complete Line of Structural Clay Products

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Kloidy, who told of the many ways in which it was equipped to aid in the solution of the problems incidental to all angles of the business and to assist in placing the industry on a profitable and serviceable basis.

Mr. Devoe presented the desirability of understanding the commission system of accounting and of keeping the company books in accord with it, since these form the basis of all rate-making, besides giving the manager and owners accurate information at any time as to how the company stands.

He explained the plant account in detail, showing what are expenses and what are chargeable to plant; and where one person owns a property, how to separate the moneys so that no confusion results and an inaccurate picture of what the property is doing be presented.

Mr. Devoe said that the commission had sought to devise as simple and yet complete plan as possible, and that its services are available at all times to explain any of the details. The results were growing better all the time.

J. E. Baggstrom, a director of the association, from the Union Telephone Co. at Wausa, was present, and explained a short-cut method he had devised in bookkeeping, with his three exchanges, so that in assembling what they did some of the old repetitions of accounts were avoided.

Northern Indiana Association to Hold Meeting Next Week.

The "summer meeting" of the Northern Indiana Telephone Association is to be held at South Shore Inn, Lake Wawasee on Tuesday and Wednesday, June 28 and 29. This is probably the largest telephone meeting in Indiana held during the year outside of the state convention.

Maintenance problems will be discussed at the men's meeting to be held on Tuesday afternoon, with Walter J. Uhl presiding. "Underground Construction" will be the subject of an address by Thad Hanway, of Monticello; W. L. Shoots, of Goshen, will talk on "Tree Trimming," and Roscoe D. Pontius, of Rochester, will discuss "Local and Toll Lines."

At the operators' conference on Tuesday afternoon, Miss Lillian Cox, of Knox, will preside. The following papers will be read: "Handling Fire Calls," by Mrs. Sarah Bolton of Warsaw; "What Is in a Voice," by Miss Marguerite Holmes, of Rochester; and "Local Operating," by Miss Mary Holland, of Logansport.

A dinner will be held in the evening with W. S. Daniel presiding. J. Raymond Schutz, of Manchester College, North Manchester, will talk on "Modern Inventions and the Future of Civilization." After the dinner, music, amusements and dancing will occupy the evening.

A general meeting will be held on Wednesday morning, at which Henry A. Barnhart, the president of the state association, will deliver an address. A general discussion of the problems of the telephone people will follow Mr. Barnhart's address.

At the men's meeting Wednesday morning, Sam Tomlinson of Plymouth will talk on executive problems, Claude R. Stoops of Nappanee on auditing and bookkeeping, and A. D. Lewis on commercial problems.

An informal discussion will open the women's meeting, with Miss Ethel Payne of Logansport presiding. Following this, Mrs. Laura Snell of Winamac will talk on "Rates from Toll Center," and Miss Esther Dysard of La Porte will talk on the "Spirit of the Service."

On Wednesday afternoon an operators' conference will be held which will be open to all, with Miss Verne Mack of Elkhart presiding. A talk on dispatch operating will be given by Miss Hoppman of South Bend, and Miss Bertha Fout of Indianapolis will discuss the problems of a traveling chief operator. Later in the afternoon a district organization meeting will be held.

Chas. S. Norton will preside at the dinner at which F. A. Montrose of Indianapolis will be the speaker.

The telephone supply men will be hosts of the evening's entertainment, when motion pictures and dancing will be enjoyed.

Broadcasting Stations Are to Be Established in India.

Broadcasting is taking on a fresh outlook in India. A company has been formed and two broadcasting stations are to be established in the Bengal and Bombay presidencies. These, if it seems practicable, will be followed by establishment of additional broadcasting stations at centers which will enable the whole of India to listen-in.

It is proposed that each station have a capacity of 12 kilowatts. It is estimated that India's stations will have a working radius of 250 miles, and under favorable atmospheric and other conditions, 500 miles.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Three New Exchanges for Chesapeake & Potomac Company.

The District of Columbia Public Utilities Commission recently authorized the Chesapeake & Potomac Telephone Co. to place new schedules into effect, providing for separation of Maryland and District telephone subscribers in the vicinity of Chevy Chase and Takoma Park, beginning July 2.

Three new telephone exchange names will be added to the list. All Maryland subscribers now having Cleveland telephones will be supplied with the prefix Wisconsin to their telephone numbers. All Maryland subscribers in the Takoma Park area with the telephone prefixes Columbia and Adams will be put on a new exchange named Shepherd. The prefix Decatur will be added to North and Potomac for telephones centering in the switchboards at Fourteenth and R streets northwest, Washington, D. C.

Residents of Massachusetts Town Protest Mileage Rates.

Residents of the Ponkapoag part of the town of Canton appeared in protest before the Massachusetts Department of Public Utilities recently against the mileage rates now charged by the New England Telephone & Telegraph Co. They based their opposition on the ground that the Canton central telephone exchange is not centrally located, insisting that if it were, only a small proportion of the Ponkapoag residents would have to pay mileage charges.

The mileage rates are 75 cents per quarter-mile for one-party service; 50 cents per quarter-mile for two-party service, and 25 cents per quarter-mile for four-party service.

It was testified that the center of population in Canton had changed and that the exchange is not in the center and that the telephone company should include the Ponkapoag section within the rate base area, thus eliminating the mileage charge.

Clyde Heath, general commercial engineer of the company, said that the Ponkapoag section is thinly settled over a wide area, and that it was no different from any other sections in the state where subscribers pay a mileage charge.

Under cross-examination by Charles Almy, one of the protestants, Mr. Heath said there was no mileage rate in Milton and Hyde Park and that in these communities there are many subscribers beyond the two-mile limit from the exchange.

Now you can charge telephone batteries without an attendant

Whether you are using automatic or manual boards, one of your constant aims is to reduce the human element to the minimum. Yet most boards still require the service of an attendant to charge the storage batteries periodically at a high rate. Frequently two sets of batteries are used, one being charged while the other is in use.

Today this is unnecessary. You can now charge storage batteries without an attendant and without removing them from service. A Balkite Charger on continuous or trickle charge keeps your batteries at full power without attention. The charger and battery are installed as a complete unit to supply unfailing Direct Current from an Alternating Current source. Due to the low charging rate, the batteries on most boards can be charged while in service without hum. Where noise is encountered, a simple Balkite filter circuit will remove it.

Our engineers will be glad to work with you on your charging problems. Write for descriptive bulletins.

Write for this booklet

Fansteel Products Company, Inc.
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Please send me a bulletin of copy TC-8 describing the new Balkite Telephone Chargers

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FANSTEEL PRODUCTS COMPANY, Inc.

North Chicago, Illinois

FANSTEEL

Balkite Battery Chargers

Mr. Heath explained that this was possible in these two places because the telephone population is great enough to warrant placing the entire communities within the rate base area.

Indiana Commission Discusses Rules on Service Rates.

Rules governing the installation of telephones was the subject of a recent conference between members of the Indiana public service commission and representatives of the Home Telephone & Telegraph Co. of Ft. Wayne.

The rules, if adopted by the commission, would provide for a reconnection service charge when telephones have been disconnected temporarily and the instrument has been removed.

Rushville Company Petitions Indiana Commission for Rehearing.

A petition asking for a rehearing of the case in which the Indiana Public Service Commission in April denied a rate increase has been filed by the Rushville Cooperative Telephone Co.

The company asserted its office equipment is obsolete, that the rate is too low and that an increase is justified. The increase the company sought would have raised the business telephone rate from $2 to $3 a month and the residence telephone from $1.25 to $1.75.

Southern Indiana Company Authorized to Increase Its Rates.

The Southern Indiana Telephone & Telegraph Co., Seymour, was recently authorized by the Indiana Public Service Commission to place in effect an increased schedule of rates at its Fredricksburg exchange and to continue its free inter-exchange service.

These rates went into effect on June 1:

Business, individual line	$2.25
Business, party line	2.00
Rural party line	1.75
Residence, individual line	2.00
Residence, two-party line	1.75
Residence, four-party line	1.65
Rural party line	1.50
Switching charges, lines and stations owned by subscribers	.75

The petitioner filed an exhibit which showed that the fair value of the plant, as of January 1, 1927, was $12,745.21, which was obtained by taking the fair value as of July 1, 1926, as found by the commission in a proceeding wherein the petitioner was authorized to purchase the property as of that date for $7,200, and adding thereto, additions and betterments to January 1, 1927.

Another exhibit filed by the company showed that the income of the Frdericksburg exchange for the six months' period ended December 31, 1926, resulted in a deficit of $249.40 before bond and other interest charges were provided for.

The commission found that a large part of the Fredericksburg exchange had been rebuilt and the service greatly improved. When the improvements were completed, the Southern Indiana company proposed to establish 24-hour and Sunday service in place of the former limited hours of service. The company proposed to continue the free inter-exchange service between Fredericksburg and Palmyra.

Free inter-exchange service had been rendered between Fredericksburg and Hardinsburg, but this service had been permitted to lapse because of the deteriorated condition of the line between the two points. The distance between Hardinsburg and Fredericksburg is approximately four miles.

The neighborhoods had so much in common that the commission decided that the free inter-exchange of service should be re-established. Further experience would be necessary for the commission to judge properly the actual revenues and requirements of the company.

High Cost Value Placed on Hand Sets by Illinois Bell.

The increased cost to the Illinois Bell Telephone Co., if the European type hand telephone sets are substituted for the desk telephones in Chicago, would amount to $3,400,000 a year, according to W. O. Kurtz, chief engineer of the company, who testified before the Illinois Commerce Commission recently.

The Illinois Bell company has petitioned the commission to permit an additional charge of 50 cents a month for the new sets, which will be charged if the commission grants the request.

Northwestern Bell Given Increase at Gothenburg, Neb., Exchange.

The Northwestern Bell Telephone Co. has been given authority by the Nebraska State Railway Commission to increase its rates at its Gothenburg exchange. The new schedule authorizes the collection of $4.75 a month for individual business, $4 for two-party business; $2.75 for individual residence, $2.25 for two-party residence; $2 for four-party residence; $2.50 for rural line residence, metallic, and $2 for grounded, with an annual service station rate of $7.60. These become effective when common battery service is available, three months hence.

Service to rural lines and service station subscribers of the Farnam and Brady exchanges is available to rural line and service station subscribers, except to switched subscribers of the Etna Mutual Telephone Co., at 25 cents a month in addition to the rates applying for service of the Gothenburg exchange.

The Etna company is given a rate of $4 over its trunks to the subscribers at Gothenburg. Service to the Cozad exchange is available to farm and service station subscribers, except Etna patrons, for a charge of 5 cents for five minutes and 5 cents for each additional two minutes. A discount of 25 cents a month is given for the monthly rates listed, and $1 discount where service station subscribers pay a year in advance.

The Northwestern Bell operates an exchange of 800 owned stations at Gothenburg and switches 88 farmers who own their lines. The present rates cover grounded magneto service, and since these became effective a considerable portion of the exchange was rebuilt and all the town lines made metallic. While substantial reconstruction has taken place in the rural sections, these lines are still grounded and will continue to be so.

Sixty-two per cent of the town subscribers, setting up that they wished modern common battery service instead of the hand ringing equipment, petitioned for the improvement, agreeing that they would not oppose the adoption of the schedule proposed and authorized.

The new schedule is an increase of a dollar a month on individual business, 75 cents on two-party business, 50 cents on individual and two-party residence, with no change in the farm line rate except that for switching, increased from $6.25 gross to $7.60 gross. Residence subscribers, who now get two-party service at $1.50 a month, will have an opportunity to secure four-party service at an increase of but 25 cents a month. Nobody appeared at the hearing to object.

The property investment at Gothenburg is in excess of $65,000. The estimated gross revenues for the next year under the new schedule is $22,750, expenses $18,768 and net of $3,802. This will not return an adequate sum, the commission says, lacking about a thousand in net revenue a year to pay 7 per cent.

No material growth is expected in the town, which is now well developed, and the commission says that unless costs are reduced, the net return will be short for some time to come. The commission says that this includes the allowance for depreciation and for licensee payment to the American Telephone & Telegraph Co., to which the commission had previously objected, but as the federal court overruled the commission, the latter must accept the allocation to the Gothenburg exchanges.

Deadlock Between Owner and Patrons Because of Service.

A deadlock between J. E. Handcock, owner of the Osmond Telephone Co. in Pierce county, Neb., and the patrons, is reported by V. L. Taylor, assistant engineer for the state railway commission, who was sent to Osmond to report on a complaint of patrons that the service was intolerable. It was accompanied by the ultimatum that if not bettered by July 1 they would quit in a body. Many signed the statement.

ASSOCIATED TELEPHONE and TELEGRAPH COMPANY

KANSAS CITY NEW YORK

AUTHORIZED CAPITAL

$18,000,000

PAID-UP CAPITAL AND SURPLUS

$3,000,000

THE ASSOCIATED TELEPHONE AND TELEGRAPH COMPANY, which is owned by British and American Interests, undertakes outside of United States of America:

1. Engineering, Construction, Management and Operation of complete Telephone Installations.
2. The Examination, Negotiation and Acquisition of Telephone Concessions.
3. Financing Telephone Operating Properties, or Extensions to Existing Plant.

THE ASSOCIATED TELEPHONE AND TELEGRAPH COMPANY and its Allied Companies own and manage directly or indirectly upwards of 300,000 Telephones, and are connected with important British and other Manufacturing and Financial Interests throughout the World.

Bankers in London

Westminster Bank Limited Guaranty Trust Company

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Commerce Trust Company, Kansas City, U. S. A.
Harris Trust and Savings Bank, Chicago, U. S. A.

London Consulting Engineers: W. W. Cook & Partners
Winchester House, Old Broad Street, London, E.C. 2

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Double Galvanized Telephone and Telegraph Wire

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At last the Telephone and Electrical Industry is assured longer life and lower maintenance on galvanized wire construction through our *new* and *improved* patented Galvanizing Process, which insures a wire with Non-Peeling and Non-Cracking Zinc Coating. Now in full commercial production. Carried in stock by Representative *Supply Jobbers*.

Illustration at right shows what happens to old process galvanizing, while illustration at left shows assured results of Crapo process—(patented).

Galvanized Steel Strand

Standard or Commercial, Siemens-Martin, High Strength and extra High Strength Grades

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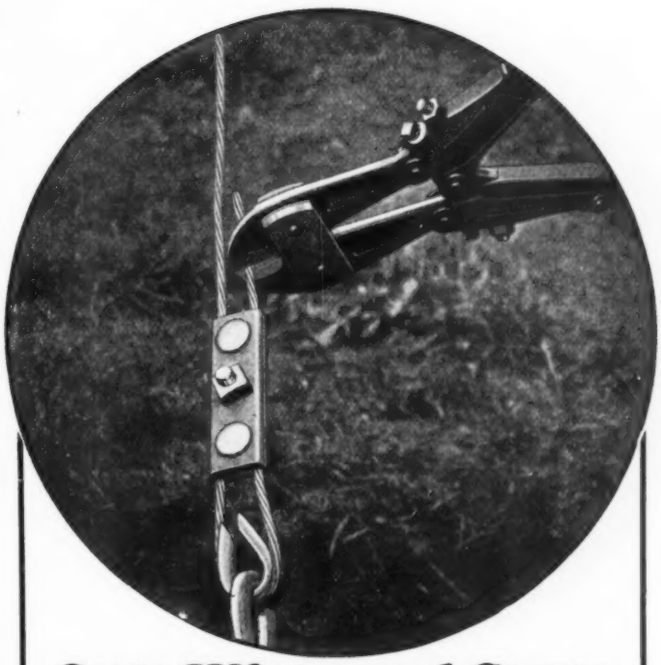

Cuts Wires and Costs

Telephone companies use hundreds of these tools—for cutting heavy wire, cable, rods and bolts—and for emergency uses without number. When labor is scarce—storms are raising havoc with the wires—when time is important you want Porter's Time Savers—Bolt Clippers, Wire Cutters and Nut Splitters. Large, small and medium to fit every purpose.

Time Savers
PORTER'S BOLT CLIPPERS

are cutting tools developing great power through leverage and a form of toggle joint. They multiply man-power about 70 times. Made in a number of styles for cutting bolts and rods, splitting nuts, cutting chains, etc. Moderate in cost and essential tool equipment for bench, shop, or kit.

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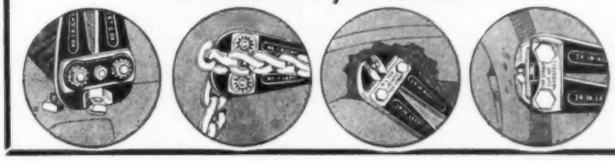

Mr. Taylor tried out the rural lines and found them in bad condition, the grounded lines yielding weak talk, and one line being out of service for two weeks. He found an old switchboard, with jacks and sleeves in bad condition. He reported that Mr. Handcock said he had bought the exchange last November and had not had time and money to bring it into better condition.

He said it would cost $3,000 to put it in service shape, and that he had prepared a petition to be presented to a meeting of subscribers, agreeing to pay higher rates if he made the investment, but the feeling was so strong against him that he kept it in his pocket.

The engineer reported that he found the feeling strong against an increase, but thought that the business men would be behind a movement to pay more if the service were bettered. Seventy-two patrons own their own lines, and Manager Handcock said much of the complaint was due to their failure to keep them in condition. He will buy them if matters properly shape themselves.

He is reported to be unwilling to do anything unless he gets higher rates, and the patrons say they will quit and organize an exchange of their own. The town is located in a rich farming country, with 104 town stations, and 188 on farm lines are switched.

Under a proper set-up, the company is losing money at its present rates of $2.25 for business metallic and $1.75 for grounded; residence, $1.50 for both services, party lines and rural, with $1.25 for those who own their station. The property is inventoried at $14,725.

Illinois Bell on Use of Operator's "Thank You."

The Illinois Commerce Commission recently held a hearing in the matter of citation to show why the Illinois Bell Telephone Co. should not comply with the commission's general order establishing standards of service for telephone utilities wherein it is required to instruct operators to repeat numbers to subscribers before completing connections.

The company thinks that the commission is not empowered to require the operators to repeat the number. The commissioners declined to argue the merits of the "thank you," which the company held was put into practice to expedite service.

Missouri Valley Company Authorized to Purchase Properties.

The Missouri Valley Telephone Co. has been authorized by the Missouri Public Service Commission to purchase the properties of the Chariton County Telephone Co., Keytesville, the Brunswick Telephone Exchange, Brunswick, with exchanges at Dalton, Indian Grove and Triplett, and the Montgomery Telephone Co., Montgomery City.

An appraisal submitted at the hearing showed the reproduction cost new, less depreciation, of all the properties involved in the transaction, to be $244,000.

The Missouri Valley company was authorized to issue and sell, or exchange for property, 1,000 shares of its no par value common stock and to issue for cash or property of equivalent value, 500 shares of its 7 per cent cumulative preferred stock of the par value of $100 per share. The commission stated, however, that nothing contained in the order should be considered as a finding of the value of the property involved for rate-making purposes.

Commission Appraisal Ordered for Telephone Company Property.

The physical property of the St. Marys Telephone Co. at St. Marys, Ohio, is to undergo a valuation, appraisement and inventory by engineers of the Ohio Public Utility Commission, pursuant to a request filed with the commission by the solicitor of the city.

Company Authorized to Issue Stock to Reimburse Treasury.

The Delphos Home Telephone Co., Delphos, has been authorized by the Ohio Public Utilities Commission to issue capital stock, the proceeds arising from the sale to be applied toward the reimbursement of the company's treasury for uncapitalized

A Changed Man

Not long ago he was P E T E R S O U R, with lines down and destroyed.

But now, since using EVER-PROTECT CABLE COMPOUND his lines are insured with a protective coating that's guaranteed to stay. Order from your jobber or direct.

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They do the job for which they were purchased, unfailingly, continually and economically. That, in a nut shell, is the reason Exide Batteries are so extensively used by the large telephone systems of the country.

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CROSS ARMS
seasoned, straight, close grain, old growth Yellow Douglas Fir.

SOLD
in carload lots only, for shipment by rail or water from factory, Bellingham, Wash.

AT LOWER PRICES
than prevail for shipments out of distributing warehouses.

Foster-Wyman Lumber Company
WHITE BLDG., SEATTLE, WASH.

Note protection at corners

Blake Insulated Staples

Unequaled for telephone and bell wiring. The fibre insulation prevents troublesome short circuits and grounds.

4 Sizes. Pat. Nov. 1900

Write for samples

Blake Signal & Mfg. Co.
BOSTON, MASS.

Mentioning TELEPHONY gives your inquiry tone.

capital expenditures made prior to February 28, 1927.

The commission found that within the five-year period next preceding the date of filing the application of the Delphos company, the company had actually expended from its treasury for net additions, extensions and improvements to its facilities, the sum of $33,675.39, no part of which had been capitalized or obtained by the issue of stock, bonds, notes or other evidences of indebtedness. Therefore, the issue and sale of stock for the purpose of reimbursing the treasury was necessary, and was authorized by the commission.

Approval Given Consolidation Into Ohio Telephone Service Co.

The consolidation of the Greenville, Sidney, and subsidiary telephone companies into the Ohio Telephone Service Co. has been approved by the Ohio Public Utilities Commission, after a readjustment in the amount of bonds to be issued in payment for the stock of the various companies.

The companies in the merger had set up a valuation of $1,600,500 on their properties, but the examiners for the commission reported a valuation of $1,263,322. Counsel for the companies amended their application to correspond with the finding of the examiners, and the consent of the commission was granted.

Southwestern Bell Allowed Increased Rates at Wewoka, Okla.

The Oklahoma Corporation Commission has authorized the Southwestern Bell Telephone Co. to place in effect an increased schedule of rates at its Wewoka exchange.

The following schedule, as of May 1, was allowed:

Business, individual line	$3.50
Business extension	1.00
Residence, individual line	2.00
Residence, two-party line	1.75
Residence extension	.50

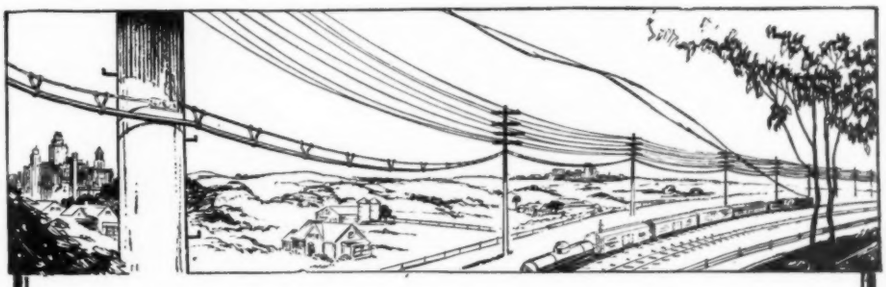
The commission found that the exchange of the Southwestern Bell company at Wewoka had recently been rebuilt and the service materially improved. The reasonable value of the plant as reflected by check of the accounts of the company was $73,874.72. An increase in exchange rates was necessary in order to enable the company to continue operation, maintain the present standard of service, and make a reasonable return on the investment, the commission decided.

Summary of Commission Rulings and Schedule of Hearings.

CALIFORNIA.

June 3: Order issued authorizing the Northern California Telephone Co. to establish an exchange at Monte Rio on the Russian River and to establish exchange rates.

June 21: Hearing on application of the Pacific Telephone & Telegraph Co. for an



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NATIONAL RINGS

MILES of cable must be hung. The service must be kept open at all times; the cables must be kept up and in repair, yet maintenance costs must be kept low.

National Cable Rings will keep down labor and material costs and keep up the cables, their use saves time, guarantees security and is the most efficient method of Cable Hanging.

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National Rings have won their place in the telephone industry because they are made to meet the most severe working conditions. They are easy to install — when once placed on the messenger can not be pulled off, no matter what the strain, and will not slip on account of the tension grip assured by their peculiar construction, and as they are perfectly smooth and correctly galvanized they will not cut the sheath.

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When you use "Nationals" you will do the work of hanging the cable easily, economically and efficiently. Write today for sample, price and full information.

The NATIONAL TELEPHONE SUPPLY CO.

5100 Superior Avenue, Cleveland, O.

N. SLATER MFG. CO., Hamilton, Ont., Canadian Mfs.

Mentioning TELEPHONY gives your inquiry tone.

increase in rates to finance reorganization of its entire system in the bay region of San Francisco.

DISTRICT OF COLUMBIA.

June 10: The Chesapeake & Potomac Telephone Co. authorized to establish three new branch exchanges, to be known as Decatur, Shepherd and Wisconsin.

FLORIDA.

June 14: Hearing held at Fort Meyers on petition of the Inter-county Telephone & Telegraph Co. for an increase in rates charged in Fort Meyers.

ILLINOIS.

June 21: Hearing at Springfield before Commissioner Johnson in the matter of complaint of the Inter-County Telephone Co., Cerro Gordo, relative to invasion of territory and unauthorized construction by the Farmers & Merchants Telephone Co. of Moultrie County, Lovington, along state bond issue route No. 32, Lovington to Decatur.

June 21: Hearing at Springfield before Commissioner W. J. Smith in the matter of the proposed advance in rates for toll service of the Hoopeston Telephone Co. in Hoopeston, Vermilion county, and vicinity, stated in rate schedule Ill. C. C. No. 1, of the company.

June 21: Hearing at Springfield before Commissioner Trovillion in the matter of proposed advance in rates for service of the Westfield-Kansas Telephone Co. for service in Westfield and Kansas and vicinities, stated in Ill. C. C. No. 3, sheets 1-A and 2-A, filed by the company.

June 22: Hearing at Springfield before Commissioner W. J. Smith in the matter of the proposed advance in rates for toll service between the Rossville Telephone Co., Rossville, and other exchanges, stated in rate schedule Ill. C. C. No. 1, filed by the company at Rossville, Alvin, Bismark, Henning and Jamesburg, Vermilion county.

June 23: Hearing at Springfield before Commissioner Kuhn in the matter of the proposed advance in rates of the Industry Telephone Co. for service in Industry, Littleton, Brooklyn and vicinities, stated in rate schedule Ill. C. C. No. 2, as filed by the company.

INDIANA.

May 2: The Southern Indiana Telephone & Telegraph Co. authorized to place in effect an increased schedule of rates at Fredricksburg and continue its free interexchange service between Fredricksburg and Hardinsburg.

June 3: Metropolitan Telephone Co., Aurora, filed petition for increase in rates.

June 6: Petition filed by Johnson County Telephone Co., Franklin, Ind., to purchase of Pierre F. Goodrich the property of the Whiteland Telephone Co., which he recently bought at a receiver's sale. The company seeks to issue no par common stock to finance the transaction.

June 6: The Lafayette Telephone Co. asked authority to issue $450,000 of 30-year first mortgage bonds to bear interest at 5 per cent. The proceeds from the issue are to go toward improvements in the plant, which include transfer to a new location and the establishment of an automatic exchange.

June 10: Petition filed asking for rehearing of the case in which the commission denied a rate increase to the Rushville Cooperative Telephone Co., Rushville.

MASSACHUSETTS.

June 8: Hearing on protest against the mileage rates charged by the New England Telephone & Telegraph Co. to residents of the Ponkapoag part of the town of Canton.

MINNESOTA.

June 16: Northwestern Bell Telephone Co. authorized to place in effect as of July 1, the increased schedule of rates as applied for its St. Cloud exchange, except for the service station switching rate.

June 17: Hearing held at Madison in the matter of the petition of the Town & Country Telephone Co., Canby, for authority to purchase the telephone property of the Madison Telephone Co.

June 17: Hearing at Climax in the matter of the application of the Red River Valley Telephone Co., Northwood, N. D., to change its schedule of rates at its Climax exchange.

June 21: Hearing held in Hewitt in the matter of the application of the Hewitt Telephone Exchange Co., Hewitt, for authority to change its schedule of rates and to establish a service connection charge at Hewitt.

June 22: Hearing at Bagley on the application of the Clover Telephone Co., Bagley, for authority to change its schedule of rates and to establish a service connection charge schedule at Bagley.

MISSOURI.

May 31: Joint application approved of the Missouri Valley Telephone Co. for authority to purchase the properties of the Chariton County Telephone Co., Keytesville, the Brunswick Telephone Exchange, Brunswick with exchanges at Dalton, Indian Grove and Triplett, and the Montgomery Telephone Co., Montgomery City, in accordance with terms and conditions agreed upon between the parties. Missouri Valley Telephone Co. authorized to issue stock.

June 2: Lafayette Telephone Co. authorized to purchase all of the physical property, together with all franchise rights and contracts, of the Malta Bend Telephone Co. in connection with the operation of the system and plant located at Malta Bend, at an agreed price of $10,000.

June 3: Application of the Lafayette Telephone Co. approved to issue and sell or transfer $10,000 of its 7 per cent cumulative preferred stock, to be sold for cash at par or issued in payment of the purchase price of the property of the Malta Bend Telephone Co., Malta Bend.

June 3: Commonwealth Utilities Corp. authorized to purchase and hold 850 shares, being all of the outstanding common capital stock of the Lafayette Telephone Co.

June 22: Hearing at Trenton on the application of the Middle States Utilities Co. to discontinue free service between Bethany and Gilman City and to make the regular toll charge.

NEBRASKA.

June 16: In the matter of the application of the Northwestern Bell Telephone Co. for authority to increase its rates at its Gothenburg exchange when common battery service is ready to be offered; found that request is reasonable and justified, and order issued.

June 17: In the matter of the application of the Blair Telephone Co. for permission to issue $60,000 of bonds; it appearing that so large an issue is not permitted by the law fixing the relationship between stock and bond issues, it is ordered that the company retain $28,000 of the issue in its treasury until further notice and to use the proceeds of the remaining $32,000, herein authorized to be sold, to pay off notes payable and for extensions and betterments, the opinion of the commission being that they are reasonably required for the purposes of the corporation and should be approved, subject to conditions.

June 18: Application filed by Dundy Mutual Telephone Co. for increase of rates.

June 18: Application filed by the Palisade Telephone Co. for validation of rates now being charged at its Hamlet exchange.

June 18: Application filed by Blair Telephone Co. for permission to charge at Kennard and Fort Calhoun exchanges the same rate for extension sets as at Blair exchange.

June 18: In the matter of the application of the Blair Telephone Co. for authority to cancel certain special rates made for schools; it appearing that this consti-

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tutes a discrimination, the request is allowed with the proviso that as schools are closed for long periods and service is not commensurate with that demanded by business houses, the residence rate hereafter apply.

June 18: Application filed by the Northwestern Bell Telephone Co. for authority to increase its rate schedule at its Sidney exchange to become effective when common battery service is substituted for present magneto system.

NEW YORK.

June 15: Hearing before William A. Prendergast, on protests of subscribers of the New York Telephone Co. at McLean Heights who protest the company's contemplated move to route future service from Mount Vernon thus incurring extra toll charges to the subscribers on calls to New York City.

OHIO.

June 3: Approval given merger of Greenville, Sidney and subsidiary companies after an adjustment in the amount of bonds to be issued in payment for the stock of the various companies.

June 6: The Citizens' Telephone Co., serving Waterville and vicinity, applied for approval of an increase in rates. The proposed increase ranges from 25 cents to $1 for various types of service. If there are no protests the increase will become effective July 1.

June 7: Delphos Home Telephone Co., Delphos, authorized to issue capital stock of the par value of $33,670, to be sold for the highest price obtainable, but at not less than par, the proceeds arising from the sale to be applied toward the reimbursement of the company's treasury for uncapitalized capital expenditures made prior to February 28, 1927.

July 7: Hearing in Columbus, on motion of the commission on the increased schedule of rates filed by the United Telephone Co., Bellefontaine, fourth revised sheet No. 7, P. U. C. O. No. 2, to become effective June 1. Schedule ordered to be suspended for a period of 120 days from April 28.

June 29: Hearing on suspension of proposed schedule for increase in rates of the Citizens Telephone Co., Circleville, for a period of 120 days from April 30.

OKLAHOMA.

June 3: Southwestern Bell Telephone Co. authorized to place into effect, as of May 1, 1927, an increased schedule of rates at its Wewoka exchange.

PENNSYLVANIA.

June 8: Hearing at Harrisburg on the proposed increase in rates by the Johnstown Telephone Co., Johnstown.

WISCONSIN.

June 22: Hearing at Madison on the application of the Gilman & Western Telephone Co., of Gilman, for authority to increase rates.

June 24: Hearing at Madison on the application of the Monroe County Telephone Co., of Sparta, for authority to revise its rules and increase its rates for telephone service.

July 7: Hearing at Wilton on the application of the Ontario & Wilton Telephone Co., of Wilton, for authority to revise its rules and increase rates.

July 13: Hearing at Madison on the application of the Belmont & Pleasant View Telephone Co., of Belmont, for authority to increase rates.

July 19: Hearing at Madison on the application of the Pewaukee-Sussex Telephone Co., of Pewaukee, for authority to increase rates.

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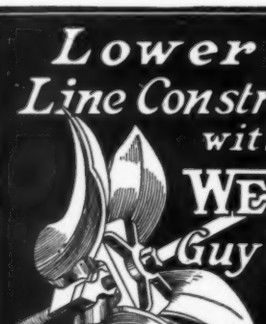

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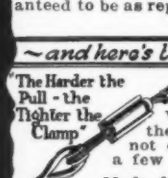

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A7, A9, G1, H1, R5, S9.

Counters
V3.

Cross Arms
A13, B13, G4, W5.

Directory Publishing and Advertising Service
W6.

Drill, Earth
B7.

Engineers, Telephone
B1, C10, F4, M4, P5, U4.

Financial Service
A8, C4, D2, D4, U4, W8.

Fire Pots and Furnaces
B16, C14, U2, W4.

Fuses, Mica
A4, C8, R2.

Generators, Ringing
G1, H5, L3.

Guy Stretchers
M6.

Hangers, Cable
C8, E4, G1, H7, K1, L2, N5, R2, S7.

Induction Coils
A4, A5, K1, L3, M6, S8.

Insulators
B13, G1, H2, P2, T2, U1.

Insulating Compounds
G1, N10, S7.

Insurance, Fire and Employers' Liability
B10.

Intercommunicating Systems
A4, G1, K1, S9.

Jacks, Pole
C9, G1, K1, T2.

Jacks, Switchboard
A4, K1, L3, S9, W3.

Keys, Switchboard
A4, K1, L3, S9.

Lockers, Steel
L5.

Meters (Electrical Testing and Measuring)
G1, S8, W1, W10.

Platinum
B2.

Pliers
C12, G1, K2, K3.

Pole Diggers
B7.

Pole Line Hardware
A4, B13, D5, G1, H7, K1, L2, N5, W3.

Pole Pullers
G1, T2.

Pole Straighteners
G1, T2.

Pole Steps
A7, G1, H7, L2.

Poles, Treated or Plain
B5, C3, I3, L4, M1, M5, M7, N6, P1, P3, S1, T6, W5.

Printed Telephone Forms
D1, F3.

Protective Devices
C8, M3, N2, R2, S2.

Radio Supplies
A4, K1, L3, S9.

Rebuilt Telephone Apparatus
B15, E2, P6, R1, S10.

Reels, Pay-out and Takeup
G1, M6.

Shelving, Metal
L5.

Sleeves, Paper
C8, R2.

Soldering Supplies
C5.

Staples, Insulated
B9.

Switchboards, Telephone
A4, A9, E5, G1, K1, L3, S9, W3.

Tanks, Portable
P7.

Tape (Splicing)
G1, S9.

Telephones
A4, A9, K1, L3, S9, W3.

Telephone Supplies (Jobbers)
A4, B13, G1, K1, N9, S9.

Testing Sets
A4, K1, M6, S8, W1, W10.

Timing Devices
C1, E5, V3.

Tool Bags
G1, K2.

Torches, Blow
B16, C14, P7, U2, W4.

Transmitters
A4, A9, G1, K1, L3, S9, W3.

Tree Trimmers
B3, G1.

Trench Braces
T2.

Trench Diggers
C13.

Trucks, Motor
I4, W7.

Underground Specialties
C9, G1, N10.

Water Stills
S11.

Winches
C9, G1.

Wire, Aeroplane
A4, R3.

Wire, Copper
A4, A5, A7, C11, I1, K1, S7, S9.

Wire Cutters
P5.

Wire, Enameled and Magnete
A5, A7, G1, H1.

Wire, Galvanized Iron
A5, A7, G1, I1, R3, P2.

Wire Rope Slings
A7, G1, R3.

Wire, Rubber Covered
A7, G1, H1, R5, S7.

Wire, Twisted Pair
A5, C11, G1, P2.

Wire, Weatherproof
A4, A5, A7, C11, G1, I1, P2, R3, S7.

Wrench, Pipe Anchor
K4.

The letter with accompanying number indicates the name of advertiser as given in full in the Alphabetical Index to Advertisers. *When making known your wants* to any company listed herein, please mention TELEPHONY.

Mentioning TELEPHONY gives your inquiry tone.

Engineering Library
JUN 25 1927

Telephony

THE AMERICAN TELEPHONE JOURNAL

PUBLISHED EVERY WEEK
BY TELEPHONY PUBLISHING CORP.,
608 S. DEARBORN ST., CHICAGO, ILL.

JUNE 25, 1927. [VOL. 92, NO. 26.]
Entered as second-class matter Sept. 4, 1903, at the post office at Chicago, Ill., under act of March 3, 1879.

SINGLE COPIES 10 CENTS
YEARLY, U. S. A., $3; CANADA, $4
ALL OTHER COUNTRIES, $5

CEDAR POLES

Quick Delivery

Prices and Quality Satisfactory "Producer Direct to Consumer"

J. J. SEGUIN CO., LTD.

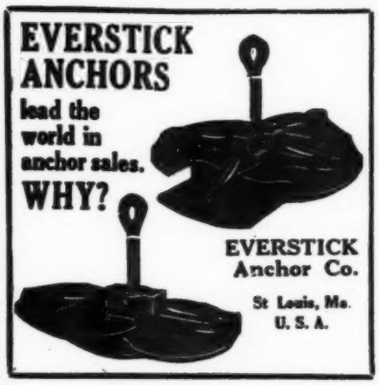
Seguin Building
421 St. Paul Street
QUEBEC, CANADA

Six men . . . or One man and a Simplex Jack

Templeton, Kenly & Co., Ltd.
Sole Manufacturers
Established 1899
Distributed by Graybar
1020 So. Central Avenue
Chicago, Ill.

American Steel & Wire Company's
Perfected TELEGRAPH TELEPHONE Wire
Perfected Strand
We announce the perfection of our new process of tight zinc coating that is smooth, deeply laid and naturally flexible as the wire.
Produced in our old reliable standard brands "Extra BB," "BB" and "Steel."
Sales offices: Chicago—New York

EVERSTICK ANCHORS
lead the world in anchor sales.
WHY?



EVERSTICK Anchor Co.
St Louis, Mo. U. S. A.

CHESTNUT POLES

Cut from unblighted trees

BUTT TREATED and UNTREATED also Fir Cross-Arms

COOK TIE and POLE CO.
Philadelphia, Pa.

HUBBARD LAG SCREWS

Hubbard Lag Screws are furnished with Fetter Drive threads unless otherwise specified. Made of mild open hearth steel with tensile strength of from 55,000 to 65,000 pounds per square inch.

Hot Double-Dip Galvanized by the Hubbard process.

—Ask Your Jobber

HUBBARD & COMPANY
Pittsburgh—Oakland, Cal.—Chicago

SANDS ELECTRIC CO.

Manufacturers

Terminals

Protectors and Supplies

SANDS ELECTRIC CO.
North Chicago, Ill.

FORT WAYNE PRINTING COMPANY
FORT WAYNE, IND.

Printers and Blank Book Manufacturers

Write for Samples and Prices on I. C. C. Forms

Ours Are the Best

Telephone Cables

ALL SIZES AND CAPACITIES

Hard Drawn Copper Telephone Wire

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

CHICAGO—20-22 West Randolph St.
CINCINNATI—Traction Building
NEW YORK—100 East 42nd St.

CROSS ARMS

Fir—Yellow Pine
Plain or Treated

LOCUST PINS, OAK BRACKETS, ETC.

All cross arms manufactured and shipped from Baltimore, Md.

GULF CROSS ARM CO.,
Fairfield P. O. Baltimore, Md.
17 Munroe St., East Cambridge, Mass.

No. 105A

DEPENDABLE service for communities where dependability has a high economic value. For over twenty years the quality of Leich phones has been tested under the severe conditions of long rural lines. Records of uninterrupted service clearly prove that those sturdy qualities required for every day service year in and year out are built into the Leich phone. And each year improvements are made which add to ruggedness and long life of these phones.

Two position switchboards fulfill a purpose sometimes overlooked in buying new equipment. Traffic conditions change and usually the trend is to increase, rather than decrease. The Leich two position board is built compact to make work easy for one operator and when changed conditions make additional help necessary the board has the extra position ready for instant service.

Lamp supervision too plays an important part in operating the Leich board. There is no hesitancy on the part of the operator because lamp signals clearly indicate what is wanted.

Cabinets are built for 200, 300 and 385 line capacity.

Two Position Low Type Switchboard

No. 15A

Hard usage of the Leich desk stand may leave its mark but the ability to serve will remain unimpaired. Substantially constructed and well balanced, the Leich desk stand meets all the requirements of modern business.

Manufactured by

LEICH ELECTRIC CO.

GENOA, ILLINOIS

Eastern Office: 17 W. 60th St., New York City

Distributors

Electric Appliance Company, Chicago, Dallas, New Orleans
Grt. Nort. El. Appliance Co., St. Paul, Minn., Duluth, Fargo
The Electric Corporation, San Francisco, Calif.
B-R Electric Supply Co., Kansas City, Mo.
Lake States Gen'l Elec. Supply Co., Post Glover Division, Cincinnati, Ohio

When writing to Leich Electric Co., please mention TELEPHONY.

"P&H Process" Poles in lines of Conneaut Telephone Co., Conneaut, Ohio.

"P&H" Production Methods assure "P&H" Pole Quality

IF you could watch the seven inspections we make of each pole—go over with us the checking of eighty-five points—during the woods production, handling, and Butt-Treating, you would understand why the highest pole quality is the inevitable result in P&H Butt-Treated Cedar Poles. "P&H Process" Poles are guaranteed, in writing, to show a full sapwood penetration to a depth of one-half inch.

Prompt shipment on all pole needs—Northern White Cedar or Western Red Cedar—Butt-Treated or untreated.

PAGE AND HILL CO.

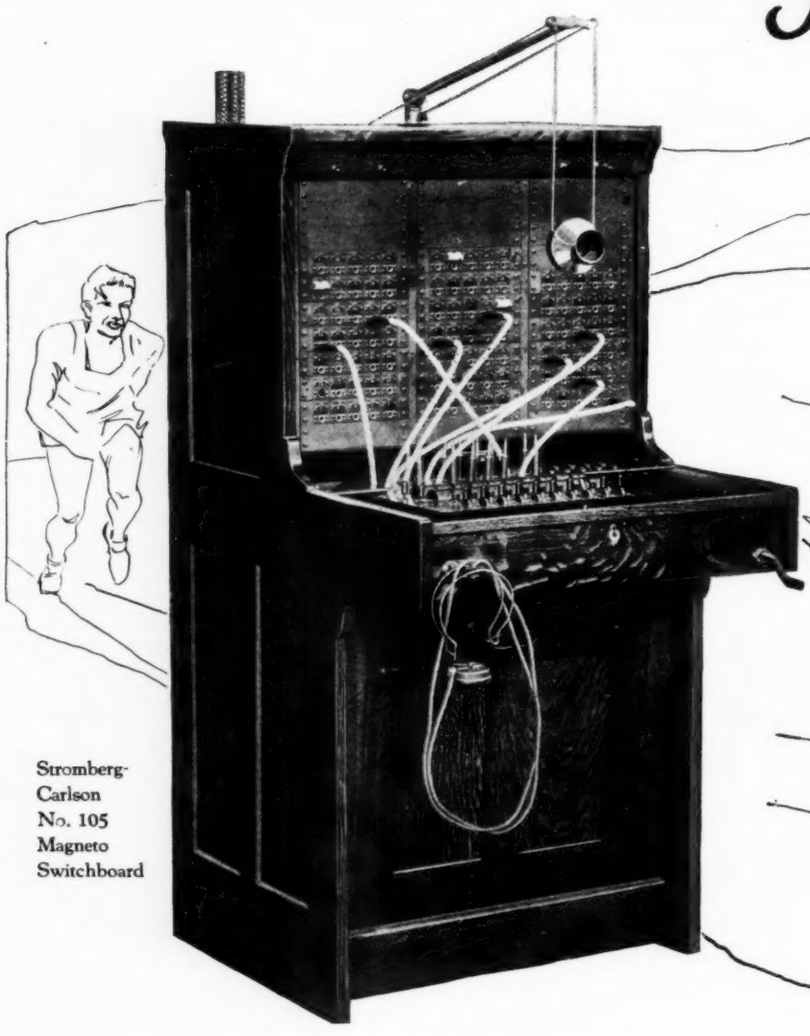
MINNEAPOLIS, MINN.

New York, N. Y. 50 Church St. Kansas City, Mo. 717 Bryant Bldg. Dayton, Ohio, 854 Reibold Bldg.
Chicago, Ill. 19 So. LaSalle St. Omaha, Neb. 734 Electric Bldg. Dallas, Texas, 521 So. Akard St.

"Still in the Lead"

When writing to Page and Hill Co., please mention TELEPHONY.

It's the long run!



Stromberg-Carlson No. 105 Magneto Switchboard

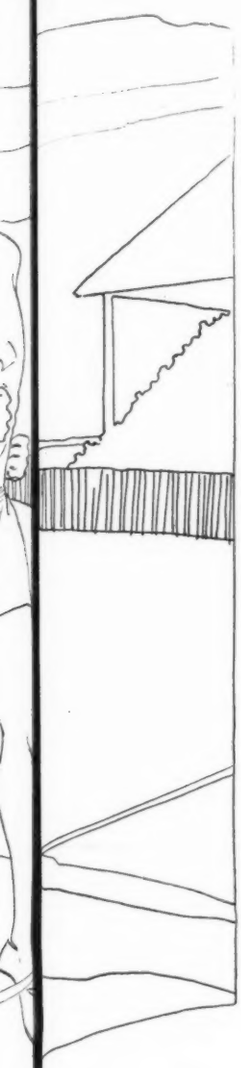
The Stromberg-Carlson No. 105 Magneto Switchboard is equipped with—

Repeating Coil Cord Circuits
Automatically Restored Line Signals
Removable Number Plates
Multi-faced Drop Shutters
Non-Ring-Through Cord Circuits
Aligned Supervision
Duratex Cords
Low Key Shelf
Keyboard Supervision
Automatically Restored Supervision
Double Supervision
Positive Supervision

Stromberg

When writing to Stromberg-Carlson Telephone Mfg. Co., please mention TELEPHONY.

hat tells the story



Telephone equipment that will bring unqualified endorsements from operating companies after twenty years of service must be built to endure.

The following excerpts from letters received show that Stromberg-Carlson magneto equipment is built with long and satisfactory service in view.

From ELLIOTT, ILL.:
"We have used Stromberg-Carlson Switchboards and telephones for twenty-three years and find no reason for making a change."

From PONTIAC, ILL.:
"We have recently installed a No. 105 Stromberg-Carlson Switchboard in our Pontiac Exchange, to replace the Stromberg-Carlson Switchboard we purchased more than twenty years ago and which was still giving good service."

From BROUGHTON, ILL.:
"We take pleasure in recommending this switchboard [No. 105] to all telephone companies who wish to furnish the best possible grade of telephone service."

From WING, ILL.:
"Our old board was a Stromberg. It was in use for twenty years. In replacing it, we considered the new 105 Stromberg-Carlson the best adapted for our use."

The Stromberg-Carlson No. 105 Magneto Switchboard embodies the same manufacturing principles that feature the Stromberg-Carlson Magneto Switchboards which have seen twenty years service, plus the latest developments in magneto switchboard construction.

This is why you can depend upon the Stromberg-Carlson for the type of service that pleases both subscribers and operating companies.

Write for Bulletin 113

Stromberg-Carlson Telephone Mfg. Co.

Factory and General Offices:
ROCHESTER, N.Y., U.S.A.

Branch Offices:
CHICAGO, ILLINOIS KANSAS CITY, MISSOURI TORONTO, CANADA

Coast Representative
ett, Young & Co.,
n Francisco, Cal.
os Angeles, Cal.
Portland, Ore.
Seattle, Wash.

Southern Representative
Scoville Mercantile
Company,
Atlanta, Ga.

Carlson

PROOF

The Winter Park Telephone Company
INCORPORATED

CARL H. GALLOWAY
PRESIDENT AND MANAGER

LENA K. GALLOWAY
SECRETARY-TREASURER

WINTER PARK, FLORIDA
February 16,1927

Kellogg Switchboard & Supply Co.,
Chicago, Ill.

Gentlemen:

On August 1st, 1925 we completed the installation of Kellogg Common Battery Feature Switchboard - three position section and cut over from Magneto Exchange on that date, and during the one and one-half years operation of this Service Switchboard it has been so satisfactory until we wish to volunteer our opinion as to the results our company has obtained from the high class service we have been able to render.

Immediately after the cut over there was such decided improvement of the service that every subscriber without exception became a booster for us, results of which caused a large increase in applicants for new services.

On November 1st, 1926 our business had increased to such an extent that it became necessary to install additional equipment that justified and required a three position section addition.

We especially like the automatic features, such as Disconnect, Recall and Ringing with tone. The Multiple lamp and Jack is now proving a considerable advantage in speeding up operator answering time since we have added the second section.

We wish also to place emphasis on our words of appreciation of the satisfactory manner in which your installation department handled our Job as we consider that it was 100% in every way.

We feel that we can not say too much in praise of the Kellogg Feature Switchboard.

Yours very truly,
WINTER PARK TELEPHONE CO. INC.
President

CHG:

Carl H. Calloway,
President,
Winter Park
Telephone Company

KELLOGG SWITCHBOARD

Branch Offices and Warehouses

COLUMBUS, OHIO
163 N. Fourth St.

KANSAS CITY, MISSOURI
308 W. 6th St., Traffic Way

Main Office
CHICAGO

When writing to Kellogg Switchboard & Supply Co., please mention TELEPHONY

F THE PUDDING

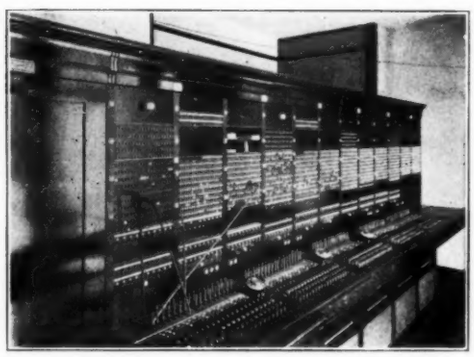
Mr. Galloway, president of the Winter Park Telephone Company, operating in one of Florida's most beautiful resorts, chose the Kellogg Service Switchboard after careful investigation.

His decision, based on the experience of other communities with Kellogg equipment, has been more than justified by the results obtained.

His Service Switchboard has been installed less than two years, during which time he has had an increase of more than 500 subscribers, has raised his rates and is giving a class of service that is not surpassed anywhere.

Mr. Galloway's experience with Kellogg equipment is no exception. The Kellogg Service Switchboard has been increasing rates and reducing operating costs in hundreds of other prosperous exchanges for nearly fifteen years.

Let us show you what it can do for you!



Kellogg Service Switchboard at Winter Park, Florida

Use is the **TEST**

R SUPPLY COMPANY

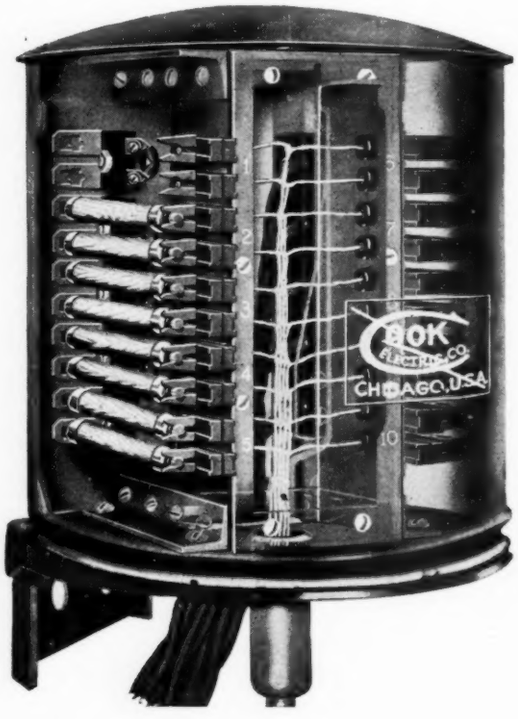
Factory
GLINOIS

Branch Offices and Warehouses

PORTLAND, OREGON
40-42 E. Seventh St.

SAN FRANCISCO, CAL.
1054 Mission St.

When writing to Kellogg Switchboard & Supply Co., please mention TELEPHONY



Built

Like the Steel Vault That Protects Your Valuables

You wouldn't think of putting your cash, jewels, or investments in a wooden box for safe keeping, would you?

Then why risk your cable plant in antiquated wooden terminal equipment?

Cook All-Steel Pole Cable Terminals will protect your cable investment as securely as your bank vault protects your personal jewels or cash.

Cook All-Steel construction means longer life, and because of its proven satisfactory service for more than twenty years, Cook Terminals are far more economical than wooden terminals.

COOK ELECTRIC COMPANY

2700 Southport Ave. **Chicago, Ill.**

When writing to Cook Electric Co., please mention TELEPHONY

"For Greater Service to Telephone Companies"

The American Line includes equipment for every month in the year!

Now is the time to check up the amount of material and supplies you have on hand for spring construction and repair work.

Almost out of some of those items! Then send in your order—you will like the quality of our products and the service we give you.

Our construction material and supplies are selected on a quality and service basis. Our large warehouse, fully stocked, and our nearness to shipping terminals enable us to give you the quickest possible service.

A trial order will prove that we can do it.

Distributor of all "COPPERWELD" Products

American Electric Company, Inc.
State and 64th Streets
Chicago, U. S. A.

"COPPERWELD"
Telephone Wire
Twisted Pair
Ground Rods

When writing to American Elec. Co., Inc., please mention TELEPHONY.

The Two-Conductor Como-Fone with the induction coil and condenser mounted in the base is well adapted for extension talking service.

Monarch
Telephone
Equipment

Additional Reve
Extension To

EXTENSION telephce
office of your sub o
and most effective ncr
of your plant.

In this age when ph
everyday necessity, tion
offered to your teleph a
time, steps and incon

The extension tel as
every use is another rea

The Wall Extensid
Como-Fone shown he h
for extension talking. T
the combined transmd
feature that your su w

"For Greater Ser ho

American Elec

State a S
Chic. A

Suc s to
Monarch Tel fact

Americ mp

Branch Office and Warehouse, lot

ves Obtained With Tone Service

phone in the home and ub one of the simplest e increasing the revenue

enphone has become an , tion telephone can be eph as a way for saving on.

tel as countless uses and r reasing your revenue.

nsid the Two Conductor he h excellently adapted ng The convenience of nsm d receiver unit is a su will appreciate.

The Wall Extension Set can be used for all classes of service, magneto, common battery manual or automatic.

Telephone Construction Material and Supplies

Ser hone Companies"

Company, Inc.

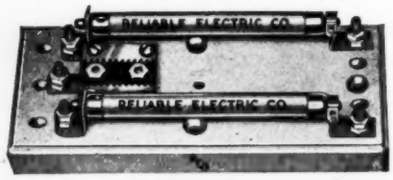
a Streets
hio. A.

Suc to
Tel acturing Co.

eric mpany

se, lotte Streets, Kansas City, Mo.

FOR SERVICE



No. 998C Arrester

Newly designed self-cleaning telephone protector of the Sawtooth type, equipped with standard fuses 4¾ inches long, shoulder to shoulder; all over metal cover, lead-in wires enter through the porcelain base.

Fuse clips, made of phosphor bronze, insure long life and perfect electrical contact.

Samples and Prices Furnished on Request

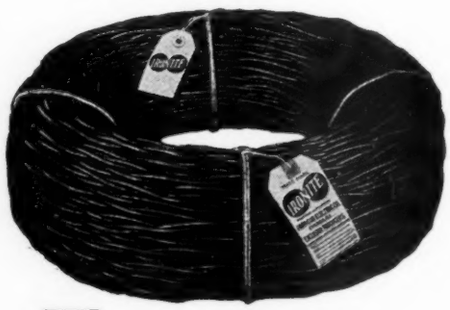
Reliable Electric Company

3145 Carroll Ave. Chicago, Ill.

TELEPHONE
PRINTING
LOWEST — BEST
THE PHONO-PRINT CO., Defiance, O.

USE
HEMINGRAY
REGISTERED
Standard Glass Insulators
HEMINGRAY GLASS CO., Muncie, Ind.

Right---
in quality
in price



Ironite
the ideal drop wire conductor

From every standpoint Ironite is unexcelled. Its great tensile strength, extra-tough insulation and high conductivity have warranted its universal endorsement by hundreds of telephone companies.
When you buy Ironite you purchase "Quality in Quantity."

Paragon Battery Boxes

Protect your dry cells installations from dust, dirt and loose wire connections. Neat and attractive. Can be furnished to house two, three or four standard dry cells.
Our nearest branch is at your service.

Paragon Electric Co.

Write our nearest branch for a test sample and prices

39 W. Van Buren St., Chicago, Ill.
206 Third Ave., S., Seattle, Wash.
1054 Mission St., San Francisco, Cal.
1612 Maple St., Los Angeles, Cal.
40-42 East 7th St., Portland, Ore.

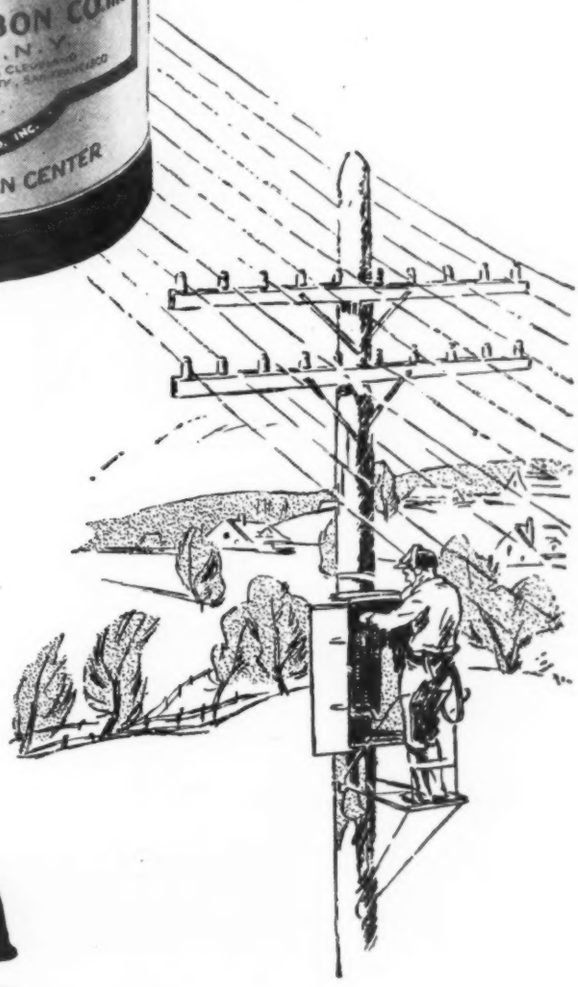
R. F. DeVoe & Co.
Incorporated
INVESTMENT BANKERS

CONSERVATIVE
TELEPHONE
FINANCING

120 Broadway
New York

Albany Rochester

COLUMBIA
TRADE MARK REGISTERED
GRAY LABEL
DRY CELL
FOR TELEPHONE
SERVICE
This dry cell combines both quality and service in the highest degree. Its quick recuperative power guarantees the greatest efficiency, reliability and long life for telephone use.
NATIONAL CARBON CO. Inc.
NEW YORK, N. Y.
ATLANTA, CHICAGO, CLEVELAND
KANSAS CITY, LONG ISLAND CITY, SAN FRANCISCO
MADE IN U.S.A.
© 1923 N.C. CO. INC.
POSITIVE TERMINAL IN CENTER



WHEN receivers are on the hook, Columbia Gray Label Batteries quietly recover strength. They rest completely but watchfully. You'll not catch them napping. When the next call comes, they spring instantly into action. Work—recuperate—rest. Work—recuperate—rest. That's the life cycle of the Columbia Gray Label Battery, repeated over and over again, day and night, for months and months.

No fussing, no fretting, no corrosive internal disturbance, and their service life is exceptionally long. That is why Columbia Gray Label Batteries cost less per month of service. Fahnestock spring clip binding posts at no extra cost.

Manufactured and guaranteed by

NATIONAL CARBON COMPANY, INC.
New York San Francisco

Canadian National Carbon Co., Limited, Toronto, Ontario

Columbia
Telephone Batteries
Best by test—they last longer

Wind Shield Insures Efficient Operation in all Kinds of Weather.
Patented Large Non-Heating Valve Wheel
Removable Burner Block. Orifice cannot be enlarged
Patented Furnace Type Burner. Greater Heat and Continuous Operation
Easily Removable Needle Cleans Burner Orifice Every Time Valve is Opened or Closed
Large Pressed Steel Drip Cup Brazed to Supply Pipe
Clevis
Filler Plug on Top Easily Filled. No Chance for Dirt to Enter
Angle Handle Restful and Easy to Hold
Pump Has Double Check Valve, Second Held in Place by Clevis
Handle Support Does Not Extend Through Tank
Fluted Base for Greater Stability
Steel Tank with Bottom and Three Connections Only Brazed. Every Tank Tested to 100 lbs. Pressure
Three Thicknesses of Steel Where Greatest Wear Takes Place

LOOK INTO THIS NEW WALL

DREADNAUGHT

This new steel torch combines all the advantages of the time-tried older Dreadnaughts with a number of improvements. Built for heavier work, to give a bigger, hotter flame. New burner cleans itself automatically. All joints brazed with hard brass spelter solder; every torch tested. Can be used in all kinds of weather. A better "service with safety" torch that has been adopted by many of the largest public utility companies. Let us tell you more about the new Dreadnaught No. 41.

P. WALL MFG. SUPPLY CO.
3126-66 Preble Ave., N. S. Pittsburgh, Pa., U. S. A.
Since 1864

Creosoted Wood Conduit

Railroad Ties, Bridge Timbers, Piles, Poles, Paving Blocks and Lumber—Manufacturers of Cross Arms, Signal Tranking and Wyckoff Conduit for Underground Wires.

WYCKOFF PIPE & CRESOTING COMPANY
Established 1881
OFFICE: 522 5th Ave., N. Y. WORKS: Portsmouth, Va.

Northern CEDAR POLES Western

Butt Treating Guaranteed Grades

Bell Lumber Company, Minneapolis, Minn.

Make the Work Easier

Your men are more efficient when equipped with—

BARTLETT Tree Trimmers

They are insulated—every way and accurately constructed to make the cutting easy and efficient. They are the popular choice of many Bell Companies throughout the country.

Trial order No. 1 Bakelite Insulated Rope Pull with 12 feet one-piece pole, $10.40, F. O. B. Detroit.

Are you Bartlett Equipped?

BARTLETT MFG. CO.
451 E. Lafayette Ave.
DETROIT - MICH.

BRIDGING twisted pair to twisted pair, a practical application of the Kearney Solderless Service Connector.

Unassembled Connector

FOR Telephone Lines in making party line taps, order Catalog No. 86. The tap can't slacken off. This connector is for No. 12 wire or smaller.

Kearney Guy Wire Serving Clips. Eliminate Serving End of Strand. Made of Aluminum, Copper, and Galvanized Iron.

ASK ABOUT KEARNEY CERTIFIED MALLEABLE SCREW TYPE ANCHORS

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

4226M Clayton Ave.

Northern Western CEDAR POLES

A full assortment of sizes
Prompt Shipments Assured.

T. M. Partridge Lumber Co.
Lumber Exchange MINNEAPOLIS

Universal Insulators
will support your drop wires to your entire satisfaction and at a minimum cost. Are you a user? Sample free on request
Universal Specialty Co.
116 So. Seventh Street
Terre Haute, Ind.

FOR DEPENDABLE **PLATINUM**
CONTACTS, WIRE, SHEET, ETC.

BAKER & CO., INC.
Newark, N. J.
We Buy Scrap

American Electric
TELEPHONES
SWITCHBOARDS and SUPPLIES
Carried in Stock by
Northwest General Electric Supply Company
St. Paul Duluth Minneapolis Fargo

GLAZED VITRIFIED CLAY CONDUITS

The Quality of our Conduits is the very best ALWAYS

We carry large stocks of round single, square single, two, three, four, six and nine duct in standard and short lengths in splits and bends.

CLAY PRODUCTS CO., Inc.
BRAZIL INDIANA